Leavenworth, Entiat, Lake Wenatchee Range Allotment
Environmental Assessment
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Range Environmental Assessment

Chapter 1 - Purpose Of And Need For Action

Introduction

This chapter describes the Proposed Action, reviews the Purpose and Need, discusses the public involvement process and details the issues relating to the Proposed Action.

Proposed Action

The Wenatchee National Forest proposes to authorize livestock grazing in the Eagle-Blagg, the Switchback, the Limekiln and the Mosquito Ridge Range Allotments and bring grazing in line with existing management plans and resource needs. This proposal includes authorizing 1,000 to 1,100 ewe/lamb pairs, with a normal grazing season of May 14th through September 15th. Grazing these existing allotments would be modified to avoid impacting sensitive plants and bighorn sheep core habitat. Routing would be restricted to avoid sites susceptible to erosion. Streamside access points would be hardened, bedding sites would be restricted or rehabbed and criteria would be established for designation of new bedding sites and grazing routes. These activities would be implemented by revising the existing Allotment Management Plans in 2000 to 2,003.

These four allotments are bounded on the south by the Forest Boundary in the Peshastin area, on the west by the Forest Boundary in the Chumstick Valley. Two of the allotments are bounded by Entiat Ridge to the east, however the Mosquito Ridge Allotment is entirely on the Entiat Ranger District in the Tillicum, Indian and Kloochman Creek areas. The allotments contain approximately 65,000 acres of National Forest System lands.

The legal description is T27N, R18E, T26N, R18E, T26N, R19E, T26N, R20E, T25N R18E, T25N, R19E, T24N, R18E, and T24N, R19E. The Eagle-Blagg Range Allotment is in the Eagle Creek, Derby Creek and Blagg Mountain Areas of the Leavenworth Ranger District. The Limekiln Range Allotment is in Mary, Dry, Second, Little Chumstick, and Beaver Creek areas. The Switchback Range Allotment is in the Walker, Van Creek, and Cromwell areas of the Leavenworth Ranger District. Adjacent and intervening lands are owned by Longview Fibre Company, The State of Washington Department of Natural Resources, and a number of small non-industrial private landowners. The planning area is within the boundary of lands ceded to the United States under the Yakama Indian Treaty of 1855.

Purpose And Need

The Rescission Act of 1995 (Public Law 104-19) directed that Range Allotment Management Plans (AMP) should be updated and put on a ten year cycle. These four AMP's were selected to update because they have similar geographic, vegetative, and ecological attributes and are tributary and in close proximity to the Wenatchee and Columbia River fisheries; and have similar issues and desired conditions. Analysis of

all four AMPs in a single NEPA document will also facilitate cumulative effects analysis. This analysis will establish and analyze a baseline of environmental information, upon which the four allotment management plans can be revised.

Since the Eagle-Blagg, Limekiln, Switchback and Mosquito Ridge AMP's were first established and revised there have been a number of new management plans which have established resource standards and guidelines. These plans include the Wenatchee National Forest Land and Resource Management Plan (1990) as amended by the Northwest Forest Plan (Record of Decision for Amendments to Forest Service Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl) (1994). These plans have established new resource standards concerning vegetative cover, riparian areas or protection buffers for wildlife or plant species. New land allocations have been established such as Late Successional Reserves, Riparian Reserves and Key Deer and Elk Habitat. While revisions of the AMP's and actual implementation through the annual operating plans have considered this new information and direction on an individual basis, a look at the entire management situation is warranted now.

The purpose and need for this proposal is threefold: (1) to provide forage for domestic livestock within the Eagle-Blagg, Switchback, Limekiln, and Mosquito Ridge Allotments, (2) to improve vegetative and watershed conditions within the Eagle-Blagg, Switchback, Limekiln, and Mosquito Ridge Allotments and (3) to bring grazing in line with current land and resource management standards and direction. The Wenatchee National Forest Plan recognizes the continuing need for forage production from the Forest and determined that these four allotments were suitable for livestock grazing. The proposed action is intended to continue this historic use.

There is also a need to improve resource conditions in several areas and to adjust grazing practices where necessary, to meet current Forest Plan Standards:

- The Eagle-Blagg Allotment contains several rare plant species which need further protection;
- The Eagle-Blagg Allotment in particular, and the other three allotments have areas where trampling is contributing to erosion or affected stream channel stability.
- To make domestic sheep grazing compatible with management plans for bighorn sheep.
- To make sheep grazing compatible with grizzly bear recovery efforts.
- To meet Aquatic Conservation Strategy objectives.

There are five main questions to consider:

1. What kind of livestock are suitable, cattle or sheep?
2. What is the capacity of the allotments?
3. What should be the season of use?
4. What are the resource concerns?
5. What are the range improvement needs?

Desired Future Condition

1. Management Direction

The Range Allotment planning area's direction for desired future condition is tiered to management direction outlined in the Wenatchee National Forest Land and Resource Management Plan (1990) as amended by the Northwest Forest Plan (1994). The Wenatchee National Forest Late Successional Reserve and Managed Late Successional Area Assessment (1997) and the Chumstick Watershed Assessment (1999) are incorporated by reference and provides more information specific to the planning area.

a. Northwest Forest Plan Amendment

The Northwest Forest Plan (Record of Decision/Final Environmental Impact Statement for Management of Habitat for Late Successional and Old Growth Related Species (1994) identifies the Beaver, Second and Dry Creek areas as within the Chiwawa Late Successional Reserve (LSR) and the Upper Eagle area as within the Eagle Managed Late Successional Area (MLSA). LSR's/MLSA's are to be managed to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late successional and old growth related species including the northern spotted owl. Range related management that does not adversely affect late-successional habitat will be developed in coordination with wildlife and fishery biologists. Grazing practises that retard or prevent attainment of reserve objectives will be adjusted or eliminated. The Chiwawa LSR is a "mapped" LSR, one of three spotted owl population cluster/source centers, designed to act as a source of populations for spotted owls, so they can disperse into adjacent, smaller LSR's. The Eagle MLSA is part of smaller "local population" centers, which are linked to the metapopulations through dispersing individuals. The Wenatchee NF LSR Assessment identified restoration opportunities for the LSR/MLSA which included protection of riparian areas from grazing and to minimize fine sediment input to streams. The Assessment also found the Eagle MLSA to be in the upper third of all LSR/MLSAs in terms of amount of vegetation at risk to loss from catastrophic fire. The Chiwawa LSR falls in the lower half of all LSR/MLSAs in terms of amount of vegetation at risk to catastrophic fire.

The remainder of the planning area is designated as Matrix. Most timber harvest and other silvicultural activities would be conducted here on suitable forest lands. Refer to the Northwest Forest Plan Map in Appendix A.

b. Wenatchee Forest Plan

Management direction for the Range Allotment Planning Area was originally established by the 1990 Record of Decision/Final Environmental Impact Statement for the Wenatchee National Forest Land and Resource Management Plan (WFP), to which this document is also tiered. Southerly and low elevation slopes are allocated to Key Deer and Elk Habitat (EW-1) where deer and elk winter range is managed to meet habitat requirements for sustaining optimum carrying capacity. Corridors along travel routes such as the Chumstick Highway, Eagle Creek, Merry Canyon and Van Creek are allocated to Scenic Travel - Partial Retention (ST-2), where a near natural foreground and middleground would be provided. The remainder of the ground is allocated to

General Forest (outside of LSR/MLSAs) where the emphasis to provide for the long term growth and production of commercially valuable wood products at a high level of investment in silvicultural practises. Embedded into each of these allocations is the Riparian-Aquatic Habitat Zone (EW-2) where the emphasis is on maintaining or enhancing riparian management areas to perpetuate their distinctive resource values. Refer to the Forest Plan Map in Appendix A.

The Record of Decision for the Wenatchee Forest Plan limits livestock grazing to 23,000 AUMs annually, which corresponds to the current demand. Grazing is also confined to existing allotments.

The Wenatchee National Forest Land Management Plan contains management standards to ensure that grazing does not conflict with sensitive native plants and big game. These standards are:

Grazing Utilization Standards

Utilization measurements and monitoring by Forest Service Administrators will target those areas identified on the allotment maps as key use or sensitive resource areas. Other areas will be monitored as necessary. Permittee participation is encouraged when the Forest Service Administrator reviews the allotment.

Maximum Annual Percent Utilization Allowed		
Riparian Areas:	**Satisfactory Condition**	**Unsatisfactory Condition**
Grass and Grass-like Forage	40%	0-30%
Shrubs	30%	0-25%
Upland/Forested Area:	**Satisfactory Condition**	**Unsatisfactory Condition**
Reforestation Units	40%	0-30%
Forest	40%	0-30%
Grasslands	50%	0-30%
Grass and Grass-like Forage	40%	0-25%

Measuring utilization of shrubs will be based on incidence of use, weight, and/or twig length (e.g. If 50 leaders out of 100 are browsed, utilization is 50%).

Management of Riparian Areas

Riparian area standards are identified to provide for maintenance of soil productivity, water quality, and fish and wildlife habitat. These standards are found in Chapter IV, pages 86-87 of the Wenatchee National Forest Land Management Plan.

Sediment

- Maintain less than 20 percent very fine sand and silt size particles (<1.0mm) in spawning habitat.
- Maintain stream substrate so that sensitive macroinvertebrate species maintain a density of greater than 200 individuals per square meter.
- Meet Washington State water quality standards for turbidity.

Temperature

- The maximum stream temperature will not exceed 61 degrees F. on any day and/or the average 7 day maximum temperature will not exceed 58 degrees F.
- Where streams naturally exceed the above standards, management activities will not cause further measurable temperature increase.

Floodplain/Riparian Vegetation

- Maintain greater than 90% vegetative ground cover provided by trees, shrubs, grasses, and sedges within the floodplain and riparian zone.

Based on the above direction, the following are the objectives for the fisheries, riparian and water resources within the planning area. These objectives are intended to help in the measurement of project attainment of the nine objectives outlined in the Northwest Forest Plan Aquatic Conservation Strategy.

- Maintain current temperature regimes in all perennial streams by maintaining shade and riparian vegetation adjacent to all stream channels.
- Minimize sediment input to stream systems where possible.

2. Other Management Direction

As a result of the concern for the spread of disease from domestic to wild sheep, former Regional Forester John Lowe endorsed a set of draft guidelines for domestic sheep management in bighorn sheep habitats developed by the Bureau of Land Management (memo dated September 1992). Of specific interest to this analysis are the following guidelines from this memo:

- Domestic sheep grazing and trailing should be discouraged in the vicinity of bighorn sheep ranges.
- Bighorn sheep and domestic sheep should be spatially separated to discourage the possibility of coming into physical contact with each other.
- Buffer strips surrounding bighorn sheep habitat should be encouraged, except where topographic features or other barriers prevent physical contact between bighorn and domestic sheep. Buffer strips could range up to 9 miles depending upon local conditions and management options.

Additional management objectives have been developed for the Swakane bighorn sheep herd and can be found in the Bighorn Sheep Herd Plans for Washington (WDFW 1995). This document outlines management priorities for each bighorn herd in the State for the years 1995 to 2000. Specific management objectives and strategies for the Swakane herd include the following:

a. Habitat Management Objectives and Strategies

1. Maintain and Improve habitat conditions in the core area.
   - Continue the cooperative agricultural program within the Wildlife area.
   - Establish water developments throughout the core area.
   - Conduct weed control efforts on the wildlife area.
   - Monitor human development and impacts on bighorns.

2. As bighorn herd size increases, promote expansion of suitable habitat.
   - Develop additional habitat improvement projects where appropriate and feasible.
   - Investigate acquisition of privately owned suitable habitat within the Swakane area.

b. Herd Management Objectives and Strategies

1. Increase knowledge of herd characteristics.
   - Conduct an annual herd composition survey during late spring.
   - Continue radiotelemetry study to monitor herd survival and distribution.
   - Gather additional information during ground surveys and in conjunction with other field work.
   - Estimate population size, and age and sex structure using survey data and modeling techniques.
2. Increase estimate population size to 50 to 60 sheep within 5 years and achieve average ram and lamb:eve ratios of 50:100 over the period.
   - Evaluate the impact of predation.
   - Evaluate the impact of diseases and parasites on the herd and put out medicated blocks as needed.
   - Monitor domestic sheep distribution and work with Forest Service to adjust allotment boundaries.
   - Provide trace mineral/selenium blocks annually.
   - Transplant into the herd at least five additional sheep.
3. Increase recreation opportunities of the herd.
   - Evaluate the possibility of consumptive use annually and follow criteria established in the Statewide plan for setting permit numbers.
   - Maintain current level of non-consumptive use of the herd.

Decisions To Be Made

Based on the analysis documented by this environmental assessment, the Wenatchee National Forest Supervisor will make the following decision:

- Whether or not to authorize continued grazing, and if yes:
- How should grazing be managed to meet standards and guidelines of existing land management plans and improve existing resource conditions?

Public Involvement

Public involvement for this analysis began in May 1998. A letter was mailed to the Leavenworth, Lake Wenatchee and Entiat Ranger Districts' scoping mailing lists which described the purpose and need, the proposed action and requested comment. The project has been listed on the Wenatchee National Forest's quarterly Scheduled of Proposed Actions. A legal ad announcing the environmental analysis process appeared in the Wenatchee World. The Forest Service received five written responses.

Issue Organization

A scoping process was used to identify the issues relevant to the proposed action. Issues and concerns were generated in the initial stages of this project by the public and the Forest Service Interdisciplinary Team. Those issues identified as "key" issues influenced how the alternatives were developed and are used to compare the alternatives in Chapter 2. Other issues were not identified as key but were used to identify effects of the proposed action and alternatives to the proposed action. These are identified and tracked through the assessment following the key issues. Issues identified, but eliminated from detailed analysis are described last. A listing of the issues follows:

1. Key Issues

1. Erosion/sediment in stream systems
2. Grizzly bear
3. Bighorn sheep
4. Sustainable carrying capacity/Forage quality and quantity

2. Other Issues Tracked Through the Analysis

5. Riparian Reserves
6. Streambank stability
7. Fish Habitat and ETS fish species
8. Water quality
9. Soil compaction/ Hillslope erosion
10. Wolverine/Gray wolf
11. Riparian dependent wildlife species
12. Survey and manage wildlife species
13. Mule deer and elk
14. LSR/MLSA/Late-successional wildlife species
15. Endangered, Threatened, and Sensitive (ETS) plant species
16. Survey and manage plant species
17. Biodiversity/Vegetation Management
18. Noxious weeds
19. Economics
20. Tree growth and structure
21. Recreation use
22. Public safety
23. Private land
24. Heritage resources

3. Issues Analyzed but not Tracked Further in this Assessment

25. Campfire risk
26. Fine fuel effects on inherent disturbance regime

Description Of Key Issues

Four issues were identified as key issues for this analysis. Key issues are defined as those that have a direct effect on the scope of the proposed action, and are used in the development of alternatives.

Key Issue #1 - Fine Sediment/Erosion in Stream Systems

Sheep trampling can cause erosion and resulting fine sediment in and adjacent to stream systems. Currently all stream systems within the allotments have abundant fine sediment as a consequence of the surrounding geology, except for the Mad River that is in acceptable condition. However, additional fine sediment from erosion caused by over-grazing, watering sites, or bedding sites in riparian areas is a concern. Fine sediment in the stream is closely tied with impairment of habitat for fisheries species due to loss of spawning and rearing habitat. Derby Canyon and associated tributaries have abundant fine sediment as evidenced by sand dunes in the stream systems. Percent fines in Chumstick Creek from pebble counts at two locations were 29% and 36 percent. Beaver Creek is better with the mainstem averaging 12 percent fines, although the South Fork averages 37 percent fines. Fines in the Mad River are low with an average of about 16 percent.

→ *How would implementation of the alternatives affect the fine sediment loads in the stream systems associated with these allotments?*

Key Issue #2, Grizzly Bear

The grizzly bear is an Endangered species that has potential habitat within the planning area. Historically, grizzly bears were found throughout the Cascade mountains (Almack et al. 1993). The closest recent confirmed grizzly bear sighting occurred about 10 air miles to the southwest of the planning area. The planning area lies within the North Cascades Grizzly Bear Recovery Zone. Because the grizzly bear is a far ranging species and highly mobile, the entire planning area was considered to be occupied by this species for the purpose of this assessment.

The potential effects that this project could have on grizzly bears includes sanitation at herder camps and disposal of dead livestock as it relates to the potential for habituation of bears. Predator control efforts could potentially result in direct effects to grizzly bears. Grizzly bears occasionally feed on livestock, raising the issue of the potential for depredation to occur. Finally, the issue of the effects of grazing on the availability of "core areas" for grizzly bears will be addressed.

→ *How would the implementation of the alternatives affect the potential for grizzly bears to become habituated to human foods or livestock?*

→ *How would the implementation of the alternatives affect the potential for mortality of grizzly bears as a result of predator control?*

→ *How would the implementation of the alternatives affect the potential for depredation of livestock to occur by grizzly bears?*

→ *How would the implementation of the alternatives affect the availability of "core areas" for grizzly bears?*

Key Issue #3 - Bighorn Sheep

Bighorn sheep historically occupied several upland areas along the Columbia River corridor. However, they were extirpated from most of this area by the early 1900's. Since then, reintroduction efforts have been implemented to restore sheep to some of their former range. A small herd of reintroduced sheep occupy the Swakane Creek drainage and extend their summer range into the domestic sheep allotments. The issues to be addressed in this assessment include competition for forage between domestic and wild sheep, and the potential to spread disease from domestic to wild sheep.

→ *How would the implementation of the alternatives affect the potential for competition for forage between domestic and wild sheep?*

→ *How would the implementation of the alternatives affect the potential for disease to be spread from domestic to wild sheep?*

Key Issue #4 - Sustainable Carrying Capacity, Forage Quality and Quantity

Forage Production

Available forage is the amount of annual forage production that is allocated to permitted livestock. According to the Land Management Standards outlined in the Wenatchee National Forest Plan (USDA 1990), only 40 percent of annual forage production will be available to permitted livestock and the remaining 60 percent will be allocated to wildlife and watershed values. Forage production is reported in pounds per acre of air dried forage. Driscoll and others have determined forage production values by plant associations for the Pacific Northwest (USDA 1998). Values calculated at the scale of plant association are much finer than the broad vegetative groups used in this analysis. In other words, each vegetative group (ex. Dry Forest Group) contains multiple plant associations, each of which has been assigned a unique productivity value. To determine what an average value would be for each of these broader vegetative groups, the following technique was used:

Three sample plots were located within each of the dominant vegetative groups found throughout the four allotments. At each site, grab samples were collected and weighed on site. Clippings were then air dried and weighed to determine dry weight. In addition, field crews surveying for PETS plant species also collected data on the dominant plant associations found within each vegetative group. The results of the grab samples were averaged for each group, and those averages were then compared to the values for the dominant series as described in Appendix 3 of the "Pacific Northwest Ecoclass Codes for Seral and Potential Natural Communities" (Hall 1998). The following table shows the final values determined from this analysis.

Average #'s Per Acre of Forage Production by Vegetative Group	
Vegetative Group	**Average #/acre of forage**
Non-Forest	
Upland Meadow	1700
Grassland/Shrubland	1200
Dry Forest	
Created Opening	800
Low Density*	884
Dense/Successionally Advanced (High Density)*	507
Partial Cut	750
Mesic Sites	
Created Opening	275
Single Layered	225
Layered Mature	200
Open Parklike	350
Moist Grand Fir/Mesic Western Hemlock Group	
Created opening	200
Subalpine fir series	
Created opening	250

*average forage production in lbs/acre calculated from site specific samples.

Forage production (range capacity) needs to be enough to provide available forage for wildlife winter range and watershed protection, while also sustaining livestock grazing. The forage productivity values shown above were used to calculate capacity values for each alternative.

→ *How would alternative implementation affect sustainable carrying capacity and rangeland health?*

→ *How would alternative implementation affect forage quality/quantity and capacity?*

Other Issues Tracked Through the Analysis

Issue #5 - Riparian Reserves

Riparian environments differ from terrestrial ecosystems in three important ways: yearly fluctuations in water level; occurrence of floods; and effects of beavers on water dynamics (Hall 1998). Yearly fluctuations in stream flow impacts soil water levels in adjacent soils, thereby affecting the kind of plant communities capable of persistence. Riparian areas within the planning area are dominated by grasses, sedges, deciduous shrubs and trees, and conifers. Small seeps and springs are scattered throughout and provide riparian micro-communities.

Some riparian communities within the planning area are changing in character due to disturbances such as road construction, logging, fire exclusion, and past grazing practices. Grazing and trampling give certain resilient species a competitive advantage

over others (USDA 1997). Continuous grazing leads to dominance of the most tolerant species, often resulting in much lower species diversify than the site potential.

→ *How would alternative implementation affect diversity of riparian vegetation within the planning area?*

This issue is also related to concern for erosion and possibility of sedimentation into the stream systems. Grazing can impact riparian ground cover in driveway areas and in bedding sites due to over use of these areas. Continuous ground cover in riparian reserves is important for stability and for filtering out of fine sediment that might be moving downhill in these reserves. The Wenatchee National Forest Plan states that the Standard and Guideline for riparian reserves is for a minimum of 90% ground cover provided by trees, shrubs, grasses, sedges and duff within the floodplain/true riparian zone. The Northwest Forest Plan directs that management of grazing should meet Aquatic Conservation Strategy objectives.

Ground cover in riparian areas help dissipate stream energies associated with high water flows, reduce erosion, filter sediment, aid in floodplain development, improve water retention and recharge, and help stabilize stream banks. Excessive utilization by sheep of shrubs and forbes within riparian reserves can decrease the effective ground cover in these areas. Large decreases in ground cover can decrease the ability of vegetation to provide the functions listed above. There are approximately 5681 acres of riparian reserves within the grazing allotments.

→ *How would implementation of the alternatives affect ground cover in Riparian Reserves.*

Issue #6 - Stream Bank Stability

This issue is associated with the fine sediment issue and stems mostly from the over grazing of areas near streams and the use of some areas for watering. Of particular concern are the areas adjacent to stream crossings, unloading and loading sites and bedding sites. Stream bank grass/forb vegetation also acts as a filter for overland flow of fine sediment. In Derby Canyon banks are considered to be impaired due to confinement by the roads with little evidence of grazing impacts. Chumstick Creek is functioning well with stable banks throughout the majority of the watershed. Roads cause some site specific areas of concern but overall this stream systems has stable banks. Beaver Creek is in good condition relative to bank stability. Site specific problems do occur at some road crossings in addition to those that are a result of grazing. Mad River banks are considered in good condition, although tributaries such as Kloochman Creek do have some negative impacts related to roads, logging, and tractor skid trails.

→ *How would implementation of the alternatives affect stream bank stability throughout the allotments but particularly at stream crossings, loading and unloading sites and bedding areas?*

Issue #7 - Fish Habitat and ETS Fish Species

This issue deals with fish species that are located within the allotment drainages. Of particular concern are steelhead (endangered), bull trout (threatened), cutthroat trout

(proposed) and spring chinook salmon (endangered). Other resident fish species exist in the watersheds and effects to them and the above listed fish species could include, loss of woody debris, increased fine sediment as discussed above, and decreased channel stability. Current conditions for these areas relative to fish habitat include Derby Creek which is considered to not be functioning appropriately for large woody debris due to previous management and from private land management in the lower drainage. Fish species are limited to resident rainbow due to blockages at the mouth that prevent steelhead from entering this drainage. Chumstick Creek is not functioning appropriately with some reaches having as low as 1.7 pieces of large woody debris per mile. Channel stability for Chumstick is good throughout the mainstem with some concerns on tributaries due to locations of roads. Beaver Creek large woody debris is very low due to previous timber harvest and roads. Channel stability is limited due to roads adjacent to the stream. Mad River and Kloochman Creeks are in stable condition, however, Tillicum Creek is constrained by roads in places which limits the channel migration. Large woody debris is lacking in all reaches associated with the allotments in the Mad River drainage.

→ *How would implementation of the alternatives affect the above listed species and associated habitat?*

Issue #8 - Water Quality

Compacted soils have lower infiltration rates and can easily develop surface runoff. Transport of sediment to streams can have an effect on water quality by increasing fine sediment levels. Decreases in riparian vegetation contribute to increased stream temperatures. Utilization of riparian sites and subsequent runoff may lead to animal waste contaminating streams.

→ *How would implementation of the alternatives affect water quality within the allotment?*

Issue #9 - Soil Compaction/Hillslope Erosion

Soils derived from sedimentary rocks of the Chumstick formation are naturally susceptible to high erosion rates. Historic grazing of large numbers of sheep has occurred in similar watersheds where soil compaction and hillslope erosion rates are high. It is likely that historic grazing of large numbers of sheep did lead to increases in soil compaction and hillslope erosion. Numerous sites throughout the allotment show evidence of accelerated erosion caused by a variety of mechanisms, particularly in the North Fork of Derby Canyon. The allotments include approximately 65,167 acres which are subject to domestic grazing related hillslope erosion and compaction.

→ *How would implementation of the alternatives affect hillslope erosion and compaction associated with these allotments?*

Issue #10 - Gray Wolf/ Wolverine

The gray wolf is an Endangered species, and the wolverine is a Threatened species that have potential habitat within the planning area. Historical evidence of the gray wolf has been documented within the planning area (Young 1994), however no recent confirmed sightings have been made. Historical information on the distribution of

wolverines is very limited, however they likely occurred throughout the Cascade Mountains (Banci 1994). The nearest recent confirmed sighting occurred about 15 air miles southwest of the planning area. Because the gray wolf and the wolverine are far ranging species and highly mobile, the entire planning area was considered to be occupied by these species for the purpose of this assessment.

The potential effects that this project could have on gray wolves and wolverines includes the potential of depredation of livestock, mortality of wolves and wolverines from predator control, and impacts to security habitat for these species.

→ *How would the implementation of the alternatives affect the potential for mortality of gray wolves and wolverines as a result of predator control?*

→ *How would the implementation of the alternatives affect the potential for depredation of livestock to occur by gray wolves and wolverines?*

→ *How would the implementation of the alternatives affect the availability of "security habitats" for gray wolves and wolverines?*

Issue #11 - Riparian Dependent Wildlife Species

There are several riparian dependent wildlife species that could be affected by the proposed activities. These include three amphibian species (Cascade's frog, spotted frog and tailed frog), five bat species (fringed myotis, long-eared myotis, long-legged myotis, Townsend's big-eared bat, and Yuma myotis), and the willow flycatcher.

→ *How would implementation of the alternative affect riparian habitat for dependent species?*

Issue #12 - Survey and Manage Wildlife Species

The effects of grazing could have an effect on habitat for survey and manage mollusk species, great gray owls, and larch mountain salamanders.

→ *Would implementation of the alternative be consistent with the management direction for survey and manage species in the Northwest Forest Plan?*

Issue #13 - Mule Deer and Elk

Management Indicator species that could potentially be affected include mule deer and elk. Both of these species use the area as primary winter range, with some summer use as well.

The potential affects to mule deer include competition for forage. The critical time period is during the winter when forage and browse are required to meet nutritional and energetic needs of deer to survive the winter. Mule deer in eastern Washington feed primarily on browse during the winter (Zeigler 1978), but also rely on forage species. Of greatest concern is whether stock are held on ranges after the grasses and forbs are gone and they begin consuming browse, reducing foods available to deer.

The potential effects to elk include competition for forage. This is particularly important during the winter, when food resources are limited for elk. Because both cattle and elk are primarily foraging species (Bracken and Musser 1993) there is a potential for competition for forage.

→ *How would the implementation of the alternative affect the potential for competition for forage between livestock and wild ungulates?*

Issue #14 - Late Successional Reserve/ Managed Late Successional Area/Late Successional Wildlife Species

Portions of the Eagle-Blagg allotment overlap with the Eagle Creek Managed Late-Successional Area and portions of the Switchback allotment overlap with the Chiwawa Late-Successional Reserve. Important issues are to determine if the proposed action is compatible with the management objectives in the Wenatchee National Forest Late-Successional Reserve Assessment (USFS 1997).

→ *How would the implementation of the alternatives affect late-successional wildlife species?*

→ *Would implementation of the alternatives be compatible with the objectives identified in the Wenatchee National Forest Late-Successional Reserve Assessment?*

Issue #15 - Endangered, Threatened, and Sensitive Plant Species

Review of the 1997 Washington Natural Heritage database, current Forest Service Records, and recent field surveys indicate there are four species of Endangered, Threatened, or Sensitive (ETS) plant species known to occur within the planning area. These species include *Cypripedium fasciculatum* (clustered ladyslipper), *Iliamna longisepala* (long sepal globemallow), *Orobanche pinorum* (pine broomrape), and *Botrycium minganense.* In addition to these known species, there is potential habitat for *Sidalcea oregana var. calva* and *Spiranthes diluvialis.* See the table below for individual species status.

Potential ETS Plant Species within Planning Area				
Scientific Name	Common Name	Federal Status	State Status	USFS Regional List
Botrychium minganense	Victorin's grape-fern	none	Review: group 2	Yes
Botrychium montanum	Mountain moonwort	None	Watch	Yes
Cypripedium fasciculatum	Clustered lady's-slipper	S of C	T	Yes
Delphinium viridescens	Wenatchee larkspur	S of C	T	Yes
Iliamna longisepala	Longsepal globemallow	S of C	S	Yes
Orobanche pinorum	Pine broomrape	None	Watch	No
Sidalcea oregana var. calva	Oregon checkermallow	Proposed E	E	Yes
Spiranthes diluvialis	Ute ladies'-tresses	T	None	No

S of C - species of concern; T - threatened; S - sensitive
Review: group 2 - more information is needed to accurately assess status due to unresolved taxonomic questions.
Watch - more abundant and/or less threatened in Washington than previously assumed.

The effects of grazing on ETS plants vary by species. Some species have the potential to be impacted or even eliminated by disturbance related to grazing.

→ *How would alternative implementation affect ETS plant species present within the planning area?*

Issue #16 - Survey and Manage Plant Species

The Northwest Forest Plan lists standards and guidelines for many late successional and old-growth related species (Survey and Manage Species). Chapter C-4 of the standards and guidelines outlines survey and manage provisions for a number of species including vascular plants, bryophytes, fungi, and lichens. There are a few survey and manage species for which there is potential habitat within the planning area. Some survey and manage species could be negatively impacted by the disturbance that results from livestock grazing.

→ *How would alternative implementation affect survey and manage vascular plants, lichens, bryophytes, and fungi?*

Issue #17 - Biodiversity

Management areas or allocations established within the planning area typically contain a mosaic of vegetative communities which are separated by ecotones. Ecotones can be defined as " a transition zone from one set of environmental conditions to another" (Hunter 1990). The majority of grazing within the four allotments considered here occurs on upland sites. The uplands' vegetation maps for each allotment were derived using aerial photographs to delineate polygons representing broad vegetation groups within each watershed. Each broad vegetation group was than divided into several different habitat types based on overstory structure. Stand identification was facilitated by local knowledge of the area, the North Cascades Grizzly Bear Vegetation Map (satellite imagery), and Area 2 ecology plots data. The accuracy of vegetative group delineations were then verified by field crews whom collected data such as plant association, tree density, basal area, canopy closure, overstory age, associated species composition, and notes on evidence of previous disturbance. Polygons were attributed and digitized into GIS. (See Appendix XX for vegetation maps by allotment). This process was developed by the Leavenworth Ranger District for use in Watershed Analysis.

a. Suitable/Primary Range

Each vegetation group located within the planning area was assessed to determine its suitability as range for sheep grazing. Suitable range represents those acres within the allotment that could be accessed by the permitted livestock and supports the necessary forage to sustain grazing. Those vegetation groups deemed suitable were then evaluated for consideration as primary range. Primary range represents those acres within the allotment that are preferred by the permitted livestock and are considered to be key use areas. Of the broad vegetation groups determined to provide suitable range, all have been designated as primary range with the exception of the dense/successionally advanced (high density) type within the dry forest group, single layered and layered/mature in the mesic group, and created openings in the subalpine fir group. (See Appendix A for maps of both Suitable and Primary Range.) The habitat types considered as primary range within each allotment were used to determine forage production and capacity. The following describes the vegetative groups deemed as suitable range:

Non-Forest Group

This group was defined as those areas with less than 10% tree canopy closure and includes two habitat types considered suitable; upland meadows and

grasslands/shrublands. Upland meadows are relatively high elevation meadows dominated by heather and dwarf huckleberry, and grassland/shrubland are areas adjacent to the dry forest group dominated by transition zone and sagebrush steppe vegetation.

Dry Forest Group

The dry forest group includes all of the ponderosa pine (*Pinus ponderosa*) plant associations and the dry associations within both the Douglas-fir (*Pseudotsuga menziesii*) and grand fir (*Abies grandis*) plant associations. (See Field Guide for Forested Plant Associations of the Wenatchee National Forest for description of these associations (Lillybridge et. al 1995)). Largely mapped under 3700 feet, this group also occurs on southerly slopes at higher elevations in the moist grand fir zone, except when hemlock is present. Four suitable habitat types (created openings, low density, dense/successionally advanced (high density), and partial cut) are found in the dry forest group. Created openings include seedling/sapling stands and recent pre-commercial thinning stands as well as partial cut areas where overstory has been removed and residual pole-size trees occupy up to 30% of the area. Low density is defined as less than 55% canopy closure with no significant understory on at least 75% of the area with trees generally larger than 12" dbh. These areas include remnant open parklike stands where tree invasion has been slow due to harsh site conditions, as well as areas that have been thinned from below. Dense/successionally advanced (high density) areas are generally over 55% canopy closure, usually with layered structure and include stands that have been lightly partial cut. Less than 25% of these stands are comprised of small openings which are the result of tree cutting. Partial cut stands are the result of moderate cutting intensity with only the larger trees removed during timber harvest.

Mesic Group

This group is dominated by Douglas-fir and sometimes grand fir, and is often found within the dry forest groups. These sites are steep north slopes (aspect 340 to 30 degrees, slope >50%) as well as very moist benches or bottomlands. Minimum size is 10 acres and steep north slope sites must appear to support dense canopy closure. Four suitable habitat types within the mesic group include created openings, single-layered, layered/mature, and open parklike. Created openings include seedlings, saplings, and recent pre-commercial thinning stands. Single-layered stands are defined as dense stands with trees 5 to 16" dbh with remnants occupying <15% of the stand and appear fine-textured on the aerial photo. Layered/mature stands have a layered canopy but also include single layered stands of large trees over 16" dbh. Open parklike stands are the same as the dry forest group.

Moist Grand Fir/Mesic Western Hemlock Group

The moist grand fir/mesic western hemlock group is generally found above 3,700 feet and below 4,900 feet elevation and includes the more moist associations of the grand fir series and the more mesic associations within the hemlock series. The dry forest group may be mapped on southerly aspects within this elevation band which are on slopes generally greater than 50 percent, mostly on the north-end of the forest. One suitable

habitat type, created openings, is found within this group. These created openings are defined as previously, including seedling, sapling, and pre-commercially thinned stands.

Subalpine fir Group

The subalpine fir series is generally found above 4900' elevation and includes one suitable habitat type, created openings. Created openings are stands of age 0-30 years and may include some scattered remnants.

b. Uplands Diversity

The majority of grazing available on each allotment occurs on upland sites. Community composition in these vegetation types has been altered from pre-settlement conditions by a number of factors including fire suppression, logging and past grazing. Rather than having a mosaic of vegetative communities, large scale homogeneous patches have developed. Species diversity has likely decreased in areas where canopy cover has increased. Grazing has also impacted species diversity by influencing natural succession. Plant succession can be defined as the 'natural replacement in an area of one species or community by another over time" (Lillybridge et. al 1995). The impacts from current grazing are most severe in areas of high utilization where sheep are concentrated such as bedding grounds and load/unload sites. The degradation of native vegetation in some of these areas has been so complete that thresholds have been passed, leaving a 'new' vegetation that is usually either simpler biologically than the native flora, or composed of invasive, less desirable plants (Johnson et. al 1994). Forage effect in these high use areas appears to be much different than the effects of once-over use where sheep are continually on the move, foraging as the slowly move across large areas.

→ *How would alternative implementation affect diversity of upland vegetation within the planning area?*

c. Riparian Vegetation

Riparian environments differ from terrestrial ecosystems in three important ways: yearly fluctuations in water level; occurrence of floods; and effects of beavers on water dynamics (Hall 1998). Yearly fluctuations in stream flow impacts soil water levels in adjacent soils, thereby affecting the kind of plant communities capable of persistence. Riparian areas within the planning area are dominated by grasses, sedges, deciduous shrubs and trees, and conifers. Small seeps and springs are scattered throughout and provide riparian micro-communities.

Some riparian communities within the planning area are changing in character due to disturbances such as road construction, logging, fire exclusion, and past grazing practices. Grazing and trampling give certain resilient species a competitive advantage over others (USDA 1997). Continuous grazing leads to dominance of the most tolerant species, often resulting in much lower species diversify than the site potential.

→ *How would alternative implementation affect diversity of riparian vegetation within the planning area?*

Issue #18 - Noxious Weeds

Weeds are unwanted, non-native plants which out-compete native plant species, invading and growing quickly in areas where habitat has been disturbed. Disturbance can include natural disasters such as catastrophic fire or flood, and human-made disturbances such as road construction, logging, or grazing. Weeds have been introduced mainly by accident and mostly, a century ago in grain and seed shipments from Europe and Asia. Some weeds have been brought here intentionally as ornamentals, and then escaped cultivation and become unwanted.

"Noxious" is a legal designation assigned to weeds that varies by state and by county. The state of Washington defines noxious weeds as "any plant which, when established, is highly destructive, competitive, or difficult to control by cultural or chemical practices." Landowners are legally bound to control those weeds designated as "noxious" at levels defined by their class designation. Five species of noxious weeds were found in the planning area; diffuse knapweed (*Centaurea diffusa*), ox-eye daisy (*Leucanthemum vulgare*), Canadian thistle (*Cirsium arvense var. horridum*), sulfur cinquefoil (*Potentilla recta*), and dalmation toadflax (*Linaria dalmatica*). See the table below for a list of noxious weed species and their legal designation.

Noxious Weeds Within Planning Area		
Species name	**Common Name**	**Class designation**
Centaurea diffusa	diffuse knapweed	Class B designate*
Leucanthemum vulgare	ox-eye daisy	Class B designate*
Cirsium arvense var. horridum	Canadian thistle	Class C**
Potentilla recta	sulfur cinquefoil	Class B designate
Linaria dalmatica	dalmation toadflax	Class B designate*

*Class B designate in parts of Chelan County and selected for control in all of Chelan County
**Class C, but selected for control in Chelan County

Removed from their natural predators and pathogens, these opportunistic alien invaders are able to spread rapidly and reduce the health and integrity of natural ecosystems. Weeds can dominate a site, forming monocultures that preclude natural succession. Weeds exhibit certain physiological and biological characteristics which help explain why they are problematic. They often have short life cycles with high seed output, and are found in highly disturbed environments, occupying the early stages of secondary succession.

Significant weed infestations occupy rangeland and other natural resource areas in the U.S. and Canada today. Diffuse knapweed (*Centaurea diffusa*) covers over 3.2 million acres in 10 states and 2 Canadian provinces (Lacey 1989). Cheatgrass (*Bromus tectorum*) occupies over 101 million western U.S. acres and is listed as the dominant plant in the Intermountain West (Mack 1981). Of the sagebrush-grass ecosystem in the Great Basin and Northwest subregion, 88%, almost 75 million acres are degraded to the point that they are producing 50 percent or less of their forage potential. Low forage production on these rangelands has been caused by overgrazing and other past land abuses (Young et. al 1979).

Many areas within the grazing allotments are populated by other non-native plant species considered to be weedy but not defined by the state as "noxious". These plants can be used as indicators of disturbance and are considered to be "undesirable". The table below list other weedy species known to occur within the planning area.

Other Weedy Non-Native Plants in Planning Area	
Species Name	**Common Name**
Tragopogon dubius	western salsify
Bromus tectorum	cheat grass
Dactylis glomerata	orchard grass
Poa bulbosa	bulbous bluegrass
Anthemis cotula	mayweed chamomile
Arctium minus	common burdock
Capsella bursa-pastoris	shepherd's purse
Cirsium vulgare	bull thistle
Plantago lanceolata	lanceleaf plantain
Rumex crispus	curly dock
Verbascum thapsus	common mullein
Trifolium spp	clover
Lychnis alba	white campion
Phleum pratense	Timothy grass

→ *How would alternative implementation affect the introduction of new weed species and/or the spread of existing weeds in the planning area?*

Issue #19 - Economic

Livestock grazing on the National Forest returns grazing fees to the Federal government, produces a valuable product, and contributes to the region's economic activity.

→ *How would alternative implementation affect economics of grazing in the planning area?*

Issue #20 - Tree Growth and Structure

Relative to pre-settlement times, tree densities in dry and mesic forest types have increased 10 fold or more (Mission Creek Watershed assessment) (Chumstick Watershed Assessment). Stand densities have increased due to fire suppression and grazing. Past logging which focused on removing large overstory trees reduced competition for sunlight and moisture and encouraged the growth and development of understory trees. This "understory" is now generally 60-90 years and is often the dominant canopy layer in many areas.

Although there is some debate on which agent fire suppression or grazing, is most responsible for increased tree densities (trees/AC) (Rummell 1951, Belsky and Blumenthal 1995), grazing has contributed to changes in forest structure:

- Grazing can encourage seedling establishment by breaking up duff or sod layers and exposing mineral soil. Seedling establishment and growth would not be expected under the heavy shade of a dense tree canopy.
- Grazing can potentially improve tree growth by reducing competing vegetation and reducing competitions for site resources such as soil moisture (Doescheretal 1989, Belsky and Blumenthal 1995).

→ *What effects would alternative implementation have on tree growth and structure?*

Issue #21 - Recreation Use

The planning area does not include any developed trails or campgrounds. There are numerous dispersed camping opportunities and informal routes used by horses, mountain bikes, and occasional hikers. An extensive road system provides opportunities for vehicle access for sight-seeing, hunting, woodcutting, and licensed ORVs. An outfitter guide operates day horse rides in the Eagle Creek area under Special Use Permit.

→ *Would alternative implementation require that recreation activities be restricted?*

→ *Would alternative implementation result in the elimination of any recreation activities?*

Issue #22 - Public Safety

Sheep use an extensive area of the allotment over the season and are often trailed along roads. If they are not trailed on roads they travel on well established driveways. These driveways are often used as informal trails by horses, mountain bikes, and occasionally ORVs. The sheep temporarily block the roads and driveways when they are on them and they move relatively slowly.

→ *What hazards would the sheep pose to the public in the areas of use?*

Issue #23 - Private Land

There is a considerable amount of private land with a multitude of owners interspersed throughout the allotment areas. Owners range from single family residents on a small lot to holders of large blocks of undeveloped forest land such as Longview Fibre Company. The sheep often cross onto private land with varying degrees of assent or non-assent by private land owners.

→ *What is the relationship between private land and sheep in each alternative?*

Issue #24 - Heritage Resources

The issue concerns whether grazing of sheep would cause damage to significant heritage resource sites.

Heritage resources are districts, sites, buildings, structures, and objects that contain evidence of past human activities. They include historic and prehistoric sites and properties of traditional religious and cultural importance.

Within the boundaries of the four grazing allotments, there are a handful of historic sites scattered over the landscape. No prehistoric or ethnographic sites are known for the

area. The following table lists the site, the type of site and its National Register eligibility status.

List of Previously Recorded Sites by Allotment				
F.S. Site #	Site Name	Eligibility	Type	Allotment
061705/014	Sugarloaf Lookout	National Register	National Register lookout	Limekiln
061706/049	Maverick Marten Sets	Ineligible	marten trap line	Limekiln
061606/053	Maverick Cabin	Ineligible	trapper's cabin	Limekiln
061706/054	Miner's Corral Ditch	Undetermined	irrigation diversion	Limekiln
061706/058	Peavine Railroad	Ineligible	logging railroad grade	Limekiln
061707/011	E. Van Creek. Meadow	Ineligible	sheep camp, cabin site	Switchback
061707/012	Van Creek Springs Sheep Camp	Undetermined	sheep camp	Switchback
061707/013	Sugarloaf Corrals	Ineligible	sheep corrals	Limekiln
061707/014	Medicine Springs	Undetermined	sheep camp	Limekiln

The identified sites are all related to historic activities of grazing, railroad logging, prospecting and trapping and early irrigation efforts. Six of these sites have evaluated for their eligibility to the National Register of Historic Places. Five have been determined to be ineligible, and therefore no longer considered in the NEPA planning process. The one site which is eligible, Sugarloaf Lookout has been placed on the National Register of Historic Places and continues to function as lookout. The three remaining sites are related to historic sheep grazing activity and irrigation and their eligibility status remains undetermined. These sites will continue to receive consideration in the planning process.

→ *How would alternative implementation affect heritage resources?*

Issues Analyzed but not Tracked Further in This Analysis

Issue #25 - Camp Fire Risk

This issue addresses the risk that the range permittee will start a wildfire with an escaped campfire. Any campfire in the forest or adjoining range land is capable of being the source of ignition for a wildfire. The Wenatchee National Forest is heavily used by recreationists, and escaped campfires are one perennial source of ignitions.

The risk of a wildfire resulting from a campfire can be eliminated if the camper builds the fire in a safe location, surrounded by mineral soil, and the fire is not left unattended at any time. When the camper leaves the area, the fire must be completely extinguished, until all material in the fire ring is cool to the touch.

The range permittee is actually less likely to mismanage a campfire than the average recreationists. Fire precautions are covered in several sections of the Annual Operating Plan and Grazing Permit. Permittees are required to carry fire extinguishers, shovel and pulaski or double bit axes, and working spark arresters are required on all equipment used. The permittees are subject to inspection at any time, with fire precaution considerations as one element of the inspection. In addition to these requirements, they agree to report and take suppression action on any fires they may detect, so the permittee may be in a position to help keep a small wildfire that they find from becoming large.

Because the permittee is more likely to report or suppress a fire than to start one through carelessness, this issue was dropped from further analysis.

Issue #26 - Fine Fuel Impacts on Inherent Disturbance Regime

This issue was raised to discuss the potential impacts that grazing has on the amount and distribution of fine fuels, and how this in turn might change the way wildfire burns. The grazing is certainly removing some portion of the grasses, forbs and shrubs that may have otherwise been available to burn. This may be an important point on specific bedding areas, which may be grazed or trampled to the point that they have become an effective fuel break.

This issue was considered but dropped from further analysis due to the scale of the impacted ground in comparison with the area of the allotments overall. Using the No Action Alternative (#1) as a basis for this analysis, the existing routes were buffered with a 200 foot wide corridor. This is an approximation of the area impacted by the passing herds, knowing that in some areas that is a wider zone, and in some the zone is narrower. That 200 foot wide corridor totals 3,327 acres out of the total size of all allotments of about 65,167 acres, or just over 5% of the area. All other alternatives include fewer acres grazed than the no action alternative. Given that these acres are already roaded, managed, and a portion burned in wildfires within the past decade, we recognize that the continuity of fine fuels found in the inherent disturbance regime is already altered.

Furthermore, under current policy, all wildfires will be managed, except those within wilderness or other areas with specific natural fire management plans completed. No natural fire management plans are in effect, or planned at this time, for any of the ground covered by these range allotments. Any ignition, from human or lightning sources, would be suppressed upon detection to protect resource values and private lands from damage. In those areas in which some resource objectives could be realized using fire as a tool, prescribed fire could be used after careful planning and coordination. Problems caused by lack of fine fuel could be solved using strategic lighting techniques or additional fuel.

Introduction

An alternative is a course of action designed to meet the purpose and need and address key issues. Alternative courses of action were developed to meet the purpose and needs and key issues identified in Chapter 1. Three Action Alternatives that propose different ecosystem restoration activities and levels of those activities are described, compared, and analyzed based largely on the issues presented in Chapter I. A No Action Alternative is also included. Maps of the alternatives are located in Appendix A.

This Chapter consists of the following five sections:

1. A description of the alternatives analyzed in detail.
2. A discussion of actions common to Action Alternatives.
3. An explanation of the alternatives considered but eliminated from detailed analysis.
4. A discussion of past, present, and foreseeable activities.
5. A comparison of the alternatives analyzed in detail.

Alternatives Analyzed in Detail

Alternative 1 - No Action (Current Situation With Existing AMP's)

Three bands of sheep would continue to graze on all four allotments as follows:

The Eagle/Blagg Allotment with 1,100 ewe/lamb pairs from 5/14 to 7/20, The Switchback Allotment with 1,000 ewe/lamb pairs from 5/15 to 7/10,

The Mosquito Ridge Allotment with 1,000 ewe/lamb pairs from 5/15 - 8/31, The Limekiln Allotment with 1,000 ewe/lamb pairs from 9/1 to 9/15.

In July at the end of the grazing season for the Eagle/Blagg and Switchback Allotments, lambs and cull ewes are removed from the National Forest and the remaining ewes are combined and are trailed through the Limekiln Allotment to the Lake Wenatchee District.

Bedding areas are restricted to "hardened sites" and are limited to two nights. Trailing routes are developed annually and are documented in the operating plan. Inspections are conducted to ensure grazing meets utilization standards. Grazing adjustments for resource reasons are completed with permittee involvement and changes are incorporated into annual operating plans.

Typical management practices included in the Annual Operating Plan are as follows:

a. Range Readiness and Turn On

Livestock entry on to the allotment or into a specific pasture will not be permitted until such time as the soils are dry enough to prevent damage and the key plant species are ready to withstand grazing.

b. Routing/Herding

Each allotment will have designated travel routes and campsite locations clearly identified on a map prior to sheep arriving on the allotment. This map/schedule will be considered as part of the Annual Operating Plan for the allotment. The actual date of movement along the designated route will be dependent upon weather conditions on the ground (Attachment B, C, D, and maps).

The permittee should plan on spending as much time as necessary in herding the sheep to achieve uniform utilization. Sheep should be kept from concentrating in riparian areas, key meadow areas, and in plantations less that 3 feet tall.

The Forest Service Administrator has the right to require camp site be bypassed, or restrict the number of days a camp can be used. This decision will be based on the previous use and the sites current condition.

c. Salting

Sheep will be salted on, or near, the bedgrounds. Place salt so that potential damage to other resources is avoided. Salt blocks will be placed on rocks, stumps, logs, or pegs. Place loose salt in trays or pans. All salt will be placed away from available water, meadows, and other grassy areas. Salt grounds will preferably be located on hardened sites such as landings, closed spur roads or old borrow pit sites. Salt will be moved as bedgrounds and camps are relocated. All salt not consumed by livestock will be removed from the site.

d. Utilization and Monitoring

It is the permittee's responsibility to ensure sheep are grazing within the utilization standards outlined in the Forest Plan. The Forest Service Administrator will be periodically verifying permittee compliance with these standards.

Areas found to be in unsatisfactory condition, or with utilization in excess of Forest Plan Standards, will be either removed from the grazing area or future use of the area will be restricted.

Utilization standards are set for riparian areas, uplands/forested areas, and reforestation units. When allowable use (Forest Plan Standards) has been reached in an area, the sheep will be required to move regardless of the forage available in association with it. For example, upon investigation it is found the utilization in the riparian area has been met, however there is still 2 days of use on the uplands/forested area before utilization standards are met; sheep will be required to move from the area and forgo the 2 days of feed to ensure riparian utilization is not exceeded.

Utilization measurements and monitoring by Forest Service Administrators will target those areas identified on the allotment maps as key use or sensitive resource areas. Other areas will be monitored as necessary. Permittee participation is encouraged when the Forest Service Administrator reviews the allotment.

e. Structural and Non-Structural Improvements

Range improvements are to maintained at a level that fully serves the intended purposes and perpetuates the life of each improvement. Basic standards for maintenance are included as part of this annual operation plan.

f. Proposed, Endangered, Threatened, and Sensitive Species (PETS)

Bighorn Sheep - Districts will begin to inventory the occupied summer and winter range for the three transplant bighorn sheep herds (Chelman Mountain, Swakane, and Umtanum). In the event that bighorn sheep range overlaps a sheep allotment, a Bighorn Sheep Conservation Plan (Species Management Guide) will be developed. New Allotment Management Plans will evaluate the effects of grazing and range management practices on bighorn sheep. Until such time as a Species Management Guide is completed or Allotment Management Plans are rewritten, the permittee will not be required to alter his operation to accommodate the transplanted bighorn sheep herds.

Alternative 2 - Meet Management Plan Standards

The theme of this alternative is to modify the existing situation (Alternative 1) so that sheep grazing would meet standards and guidelines from the Wenatchee and Northwest Forest Plans. The same numbers of sheep as Alternative 1 would continue grazing on all four allotments, with the following changes to management practices:

a. A portion of the Eagle-Blagg Allotment would not be grazed and other Restrictions would be Imposed as follows:

- 1) To stay out of core bighorn sheep habitat (about 200 acres).
- 2) To avoid viability centers for Cypripedium fasciculatum (50 acres).
- The season of use would be reduced by 2-4 days to accommodate this reduced size.
- Restrict routing to avoid sites susceptible to erosion.
- Establish criteria for identification of new routes; routes would be rotated each year.

b. Fish/Hydrology Management Strategies: (see following table for site-specific locations).

- Streamside access points would be hardened with rock or wire mesh screen.
- Deletion of bedding sites responsible for introducing sediment into creeks. These sites are generally close to riparian areas, on steep slopes and/or with shallow soils.
- Identify bedding sites to restore and use again in the future.
- Designation of acceptable bedding sites.
- Criteria for establishing other bedding sites are:
  - Previously hardened.
  - Flat
  - Some distance from running water.
- No loose trail herding in Riparian Reserves
- Wetlands would have a 300-foot 'no grazing' buffer.

c. Wildlife Management Strategies

- Grizzly bear feeding areas (meadows, stream bottoms) would be kept available when there are active bears in the area. Sheep would be herded around areas when occupied.
- No express or implied authority for predator control.

d. Rare Plant Strategies

- Restrict grazing and/or re-route to avoid rare plant viability centers
- Monitor effects of grazing on rare plant outliers.

e. Weed Strategies:

- Implement all Best Management Practices (BMPs) from the Draft 'Wenatchee National Forest Noxious Weed Prevention Strategy' that are relevant to this activity.
- Implement all projects from the Wenatchee National Forest Noxious Weed Environmental Assessment that are located within the planning area.

Alternative 3

Alternative 3 would meet current Management Plan Standards as in Alternative 2; and is similar to Alternative 2 in adopting new management practices for sheep grazing. In addition, it addresses the problem of disease spreading from domestic sheep to wild sheep by separating the two populations. Eagle, Van, and Tillicum Creeks would be used as topographic boundaries. Domestic sheep would not be allowed to graze south of the creeks. Therefore, grazing would be restricted on the Eagle-Blagg Allotment and portions of the Switchback and Mosquito Ridge Allotment. (See Map xx, Appendix A). One band of sheep (1,000 ewe/lamb pairs) would graze portions of the Switchback, Mosquito Ridge, and Limekiln Allotments from May 15 to August 31.

Alternative 4 - (No Grazing would be Authorized)

The emphasis of this alternative is to make domestic sheep grazing compatible with the management plans for bighorn sheep (WDFW 1995). A buffer zone to keep domestic sheep 9 miles from the bighorn sheep core habitat area would be implemented. This buffer zone includes virtually all of the four allotments, therefore domestic sheep grazing would be restricted on all four range allotments.

Grazing Strategies

Grazing strategies and operational measures are contained in the permittee's annual operating plan. A copy will be available in the analysis file for this environmental assessment. The following are common sheep grazing practices on the Wenatchee National Forest, which are part of all alternatives which include grazing activities (Alternatives 1, 2, 3):

1. A herder will accompany the sheep band.
2. Herding routes or grazing travel routes will be annually designated.
3. Campsites and bedding grounds will be located on previously hardened sites and will be annually designated and left clean.
4. All salting will be on or near bedding grounds.
5. Grazing season, livestock numbers and authorized grazing areas will be monitored.
6. Grazing permits do not authorize the permittee to initiate animal damage control (predator control).

All of these conditions are described in detail in the permittee's annual operating plan (AOP).

1. Eagle-Blagg Allotment

Seven bedding sites within the Eagle/Blagg allotment would be closed due to concern for severe erosion and/or sediment delivery. Another two sites would be relocated further from streams or drainages in order to decrease potential sediment delivery. Using an estimate of one acre per bedding site, there are at least seven acres with severe erosion due in part to grazing with an additional 2 acres with the potential to contribute sediment directly to streams. There are an unknown number of acres along driveways experiencing accelerated erosion and sediment delivery to streams. From a strictly qualitative perspective, the lower portion of this allotment (N. Fork Derby) is experiencing the greatest resource damage due to grazing of all the allotments.

2. Switchback/Limekiln Allotments

Five bedding sites within the Switchback/Limekiln allotments would be closed due to concern for severe erosion and/or sediment delivery. Another ten sites would be relocated further from streams or drainages in order to decrease potential sediment deliver. Using an estimate of one acre per bedding site, there are at least five acres with severe erosion due in part to grazing with an additional 10 acres with the potential to contribute sediment directly to streams. There are an unknown number of acres along driveways experiencing accelerated erosion and sediment delivery to streams. There are an unknown number of acres along driveways experiencing accelerated erosion and sediment delivery to streams. In particular, the East Van Creek Meadow needs to be restored. Bedding and shipping activities would be restricted in the meadow.

3. Mosquito Ridge Allotment

At least two sites would be moved due to proximity to streams and sediment delivery while another four sites would be relocated further from streams or drainages in order to

decrease potential sediment delivery. Using an estimate of one acre per bedding site, there are at least six acres with the potential to deliver sediment to streams. There are an unknown number of acres along driveways experiencing accelerated erosion and sediment delivery to streams. In particular, if the Tillicum shipping site continues to be utilized, corrals would be required.

The following chart (next page) details management direction for specific bedding sites.

Bedding Chart Eagle/Blagg			
Bedding Ground #	**Ground Condition**	**Decision**	**Mitigation**
1, 2, 3		keep/review	explore alternate years for loading site use; harden watering sites; corral on road.
4	severe site erosion	close	rehab., seeding. harden/rehabilitate stream crossing, install sediment barrier in stream (slash etc.)
5		close/move	
6,8		keep/review	move further from stream, harden water sites
7		keep	may need rehab, seeding
9,10,11,12,15,16, 18,20,21,23,24,26		keep	may need rehab, seeding
13		keep	keep on ridge, reduce grazing in draw
14,17,19	sensitive plants, erosion	close/move	
22		close/move	move to saddle along ridge
25	outside allotment	close /move	move away from spring
27		keep/review	harden water chance, plant riparian veg at stream, rehabilitate meadow, possible exclosure in meadow
Switchback/Limekiln			
28,29,32,33,36, 40,42,43,53,54, 55,56,60,61,62, 63,66,70,69,72, 73,75,76,77		keep	confine to hardened site or ridgetops
30,34,37,38,39, 51,65,67,68,81	proximity to stream	keep/review	harden watering sites, relocate >200 feet from stream
31		keep	corral on hardened sites to keep out of stream. harden water sites. rehab, treat for noxious weeds
35		close	move to new site further from stream or to ridge top
52,		keep	reseed south slope
57,58,59,71		close/move	move to adjacent ridge top
64		keep/review	move onto or above road, harden water site
80,82		keep	
Mosquito Ridge			
1,2,3,4,6		keep	
5	within 100 feet of stream	keep/review	
7	within 100 feet of stream, noticeable site impacts	keep/review	corral on hardened site, harden water site
8		close/move	move to ridge
9	w/in 100' of stream	close/move	stay on ridge
10	noxious weeds, low veg cover	keep/review	move to ridgetop alternate years, reseed, noxious weed control
11,12,13,17,18, 19,20,21,25,26		keep	
14	noxious weeds	keep	noxious weed control
15	heavy utilization, erosion in s. draw	keep	confine to flat ridge top, keep out of draw
16,22	heavy utilization	keep/review	move to disperse utilization, look at rehab/reseeding
23	adj. slope steep	keep/review	confine on road or move to ridge top
24	w/in 100' of stream	keep/review	move along rd. > 200' from stream harden water sites

4. Criteria

1. Criteria to determine if a bedding site would be moved or closed:

1. Slope greater than 30 percent.
2. Distance to stream or drainage <200 feet.
3. Site not hardened (e.g. road or landing).

New site characteristics would be in line with the above criteria (site should be greater than 200 feet from stream or drainage for example). Where hardened sites are not available, ridgetop sites are preferred. This would maximize distance to streams decreasing sediment delivery, and most likely shallower slopes. Identified stream crossings or watering sites would be hardened with concrete grid pavers. Riparian vegetation would be protected or replanted where necessary.

2. Criteria for bedding sites

Objective: A set of criteria follows for bedding sites that would:

- Minimize or prevent sediment delivery to streams.
- Minimize or prevent hillslope erosion and soil disturbance.
- Prevent adverse effects to sensitive plants and wildlife.
    - Every effort would be made to insure bedding sites are greater than 200 feet from stream courses.
    - Maximum slope for bedding sites would be 30 percent.
    - Loose herd trailing would be employed to and from bedding grounds to promote dispersal.
    - Bedding would occur on ridge tops or previously hardened sites (roads, landings, etc.).
    - Maximum stay at any given site is two nights.
    - Salting near bedding grounds would occur only on hardened sites.
    - No bedding would occur near known populations of sensitive plants.
    - Bedding sites to be closed should be rehabilitated and revegetated where sediment delivery to stream courses is occurring.

If a bedding site must be within 200 feet of a stream course:

- Site must meet *Forest Plan* Riparian Vegetation standards (IV-88). Standards are a minimum of 90 percent ground cover provided by trees, shrubs, grasses, sedges and duff within the floodplain/true riparian zone.
- Maximum slope for bedding sites would be 10 percent.
- Sheep will be corralled at loading and shipping sites on hardened land.
- No salting would occur within 200 feet of stream courses.
- Site must be hardened, or where bedrock is close to the surface.

The 'Interim Sanitation Direction' described in the 8/12/97 Memo signed by the Forest Supervisor would be implemented. This includes the implementation of proper food storage and handling, and disposal of domestic animal carcasses to reduce their availability to wildlife. The Washington Department of Wildlife would work to educate private land owners who own domestic sheep in or near the bighorn sheep range to reduce the potential spread of disease.

3. Effectiveness of Mitigation

Measures such as restricting grazing/managing bedding sites and routes are very effective for reducing impacts to rare plants, areas of erosion and riparian areas, if implemented properly. If a herder does not follow these measures, then they are not effective. Daily administration of the permit by the Forest Service would ensure effectiveness.

Buffer zones to separate domestic and wild sheep, to prevent spread of disease, are effective if implemented properly. Stray sheep do occasionally get separated from the herd and could wander toward the bighorn sheep core habitat.

Alternatives Considered but Eliminated From Detailed Study

An alternative was considered that would add ground to existing allotments, in light of Alternatives 3 and 4 restricting grazing, because of the bighorn sheep core area. Adjacent ground on the Entiat Ranger District in the Sourdough, Tamarack and Dinkleman areas appeared to have the same proximity conflict with the bighorn sheep core area. Ground to the north of the Lake Wenatchee Ranger District has too much tree cover to develop enough forage. Other ground to the south and east on the Leavenworth Ranger District is too interspersed with private ground to develop a good allotment or provide an effective buffer for the bighorn sheep population (considering domestic sheep that are being raised on private land). Considering further ground for new allotments did not appear to be feasible and is outside the scope of this analysis, which is to develop alternatives for range management in these four allotments. Expansion of the existing allotments would require an amendment to the *Forest Plan.*

An alternative that would graze cattle on the four allotments was considered. It was determined that cattle would be difficult to administer to meet management standards. Much of the planning area is rather steep ground with narrow, v-shaped creeks that would be very difficult to keep cattle out. Cattle easily cause damage to streambank areas because of their size and their propensity to gather around water. In addition, a large number of range improvements would be necessary to even attempt to manage cattle on these allotments. Therefore, it was decided that this alternative did not warrant further study because it was not feasible and is unreasonably expensive.

An alternative that would thin trees and prescribe burn to promote forage and increase livestock carrying capacity was considered. However, this does not meet the purpose and need of updating the four allotment management plans, based on current conditions. These projects themselves would require environmental analyses to assess effects. This alternative is outside the purpose and need of this analysis.

An alternative that would change the timing of the grazing season was considered. The season cannot be moved earlier in the year as soils are too wet and grasses have not matured enough. Moving the timing later would not provide an orderly transition of range from low country to high country through the summer. This alternative did not seem feasible and was not analyzed further.

Cumulative Effects Analysis Activities

Discussion of environmental effects in Chapter 3 has considered the proposed action plus past, present and reasonably foreseeable actions that may occur in the planning area. This section is meant to summarize these past, present and foreseeable activities.

1. Past Activities

Before the advent of European settlement, the planning area was dominated by ponderosa pine/Douglas-fir stands which were maintained by frequent, low-intensity fire. Native Americans may have lighted some of these fires to maintain favored species composition. They visited the planning area for food gathering or hunting activities from main camps in the Wenatchee or Columbia Valleys. With the advent of European settlement, sheep grazing, timber harvest and fire suppression all became dominant activities which have affected vegetative structure and composition. Virtually the entire planning area has seen timber harvest which was accomplished largely with ground-based yarding systems.

The current grazing permittees in the planning area date to the 1960s. Grazing in the planning area has been continuous, with some periods of inactivity since the later 1800s. The shape of the allotments has changed over the years to respond to management concerns and standards of the day. Portions of all the allotments have been burned by wildfires in the last decade.

2. Present Activities

Sheep grazing is occurring on the National Forest in adjacent areas; the Rainy Jove Allotment on the Lake Wenatchee Ranger District and the Mills Roaring Allotment on the Entiat Ranger District. The Washington State Department of Wildlife has re-introduced a herd of bighorn sheep on the Naches Ranger District. They have also re-introduced and augmented a herd of bighorn sheep on the North Shore of Lake Chelan. Residential development is occurring on most private lands in the Chumstick Watershed. Private development sometimes includes small ranches that raise domestic sheep. Dispersed recreation use, such as driving, biking, camping, hiking, and stock use occurs in the entire Chumstick Watershed. The William Timber Sale is active in the Eagle-Blagg Allotment.

3. Foreseeable Activities

The Washington State Department of Wildlife has plans to augment the Swakane Bighorn Sheep Herd to bring numbers up to 50 to 60 head. The Forest Service plans to do additional Range Allotment Planning Analysis on adjacent allotments listed under 'Present Activities'. The Forest Service plans to implement dry forest ecosystem restoration activities, consisting of tree thinning, pruning, and prescribed burning in the Blagg Mountain and Chumstick areas in the next decade. The Chelan County Public Utility District has proposed widening the existing Chumstick Transmission Line to increase electric transmission capacity to the Lake Wenatchee area. The Forest Service has proposed to restore the Eagle Lake Trail and dispersed camping area. Continued residential development is expected to occur on private land through the Chumstick Watershed. This will sometimes involve small ranches raising domestic

sheep. Continued timber harvest on private land is expected to continue, mostly influenced by lumber market conditions and the regulatory environment. Increased dispersed, day-use recreation is expected as the residential population increased in the Chumstick Valley.

Implementation

If Alternative 2 is selected, it would be implemented the next field season; any new bedding grounds or grazing routes would become part of the next annual operating plan. If Alternatives 3 or 4 were selected, they would be implemented: (1) at the end of the current permit period (4 years), and (2) if the Washington State Department of Wildlife meets the Swakane Bighorn Sheep Herd Plan objectives and strategies. When the current permit expires, a temporary permit would be issued for the newly closed part of the Allotment, and grazing would continue on an annual basis, until the State achieves those objectives and strategies.

Alternatives 3 and 4 would require an amendment to the Wenatchee Forest Plan to reduce the grazing capacity on the Wenatchee National Forest. The Forest Supervisor would recommend to the Regional Forester that these allotments be closed.

Monitoring

All Cypripedium fasciculatum populations would be monitored.

All areas requiring revegetation would be monitored for seedling germination and establishment the first year following application of seed.

The District wildlife biologist and staff would monitor bighorn sheep range utilization.

Northern spotted owls, goshawk, and other raptors would be monitored.

Existing roads would be monitored to assure that herding is effective keeping roads open.

Grazing would be monitored by the Range Specialist to assure appropriate herding practices and selection of bedding sites area used, especially with respect to Riparian Reserves. The Range Specialist would also monitor range utilization, forage quality and quantity, camping practices, and carcass management practices.

Comparison of Alternatives by Key Issues					
		Alternatives			
Key Issue	**Measure of Effects**	**1**	**2**	**3**	**4**
Erosion/ Sediment in stream systems	Acres open for grazing Potential for grazing induced sediment to enter stream systems	65,000 High	63,000 Medium	31,000 Low	0 None
Grizzly Bear	Reduction in sheep number (percent)	0	slight	66	100
	Percent grizzly bear core area (early/late) where grazing would be permitted by Bear Management Units (BMU)				
	Lower Wenatchee BMU	12/11	12/11	9/8	0/0
	Chiwawa BMU	1/1	1/1	1/1	0/0
	Lower Entiat BMU	<1/<1	<1/<1	<1/<1	0/0
Bighorn Sheep	Percent range allotment overlap w/ bighorn sheep range. Risk of disease spread from domestic sheep to bighorn sheep	60 High	60 High	0 Moderate	0 None
Sustainable carrying capacity/ Forage quality and quantity	Animal months grazing Percent forage utilization of current allotment Percent forage utilization of restricted allotments	8,554 25 25	8,370 24 24	2,930 8 22	0 0 0

Chapter 3 - Environmental Consequences

Introduction

This section discloses the direct, indirect, and cumulative environmental consequences of implementing each of the alternatives in relation to the issues discussed in Chapter 1. The intent of this section is to provide the scientific and analytical basis for the comparison of alternatives. The various alternatives propose actions that would affect the physical, biological, social, and economic components of the human environment. The terms "effects", impacts", and "consequences" are used interchangeably. They can be quantitative or qualitative, short-term or long-term in duration, adverse or beneficial, real or potential, tangible or intangible, significant or insignificant, unavoidable, irreversible or irretrievable, and can conflict with the actions of other agencies. The effects disclosed have considered the effectiveness of the mitigation measures outlined in Chapter 2.

The effects resulting from each action are described in terms of their context, intensity, and duration. These activities, occurring in the same area over time could, under certain circumstances, be incremental and produce cumulative effects. It is necessary to look beyond the defined planning area boundary to determine the cumulative effects on certain resources. The effects disclosed have considered the past, present and foreseeable actions outlined in Chapter 2.

The assessment of effects assumes that proposed projects would comply with policies and standards established in the National Forest Management Act of 1976, the National Environmental Policy Act, Forest, Regional and National Planning document standards and guidelines, and other Federal Laws.

Many of the effects discussed in this chapter are complex and not easily quantified. In this light, it should be kept in mind that many of the values presented are modeled predictions of the effects, and that the actual effects may not occur exactly to the degree presented.

Each environmental component shown in the issues section (Chapter 1), is discussed in terms of the consequences of implementing each of the alternatives listed in Chapter 2. This allows the reader, only interested in specific issues, to find all the effects related to that issue in one place. This is organized in the following format for each environmental component:

- Important Interactions is a description of the cause and effect relationships. It provides background for understanding the discussion that follows.
- Environmental Effects are discussed under three headings: common to all alternatives; common to groups of alternatives; or specific to individual alternatives.

Three types of effects are considered for each situation:

1. Direct Effects are caused by the action and occur at the same time and place [40 CFR 1508.8(a].
2. Indirect Effects are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable [40 CFR 1508.8(b)].
3. Cumulative Effects are those that result from the incremental impacts of the action when added to other past, present, and reasonable foreseeable future actions [40 CFR 1508.7].

It is not always possible to distinguish between these three types of effects.

The following three criteria are considered under each environmental component as they occur and are summarized at the end of the chapter.

- Short Term vs. Long Term discusses the relationship between short term uses of man's environment and the maintenance and enhancement of long term productivity.
- Unavoidable Effects are those adverse impacts that could not be avoided should the alternative be implemented.
- Irreversible/Irretrievable Effects discusses any irreversible impact on a nonrenewable resource or any irretrievable impact on a renewable resource.

Key Issue #1 - Fine Sediment/Erosion in Stream Systems

Q. How would implementation of the alternative affect the fine sediment loads in the stream systems associated with these allotments?

Environmental Effects

Alternative 1

This alternative would have the highest risk for fine sediment to continue to erode into the stream system. The existing situations of abundant fine sediment at some stream crossings/watering locations, bedding sites in riparian areas, and loading/unloading sites in the allotments would continue. Fine sediment loads, while not increasing, would continue to be in a degraded state due in part to grazing activities in Derby Canyon, Eagle Creek (and associated tributaries), and in Beaver Creek. Mad River (which Tillicum Creek flows into) fine sediments, while not currently in a degraded state would not improve, as no grazing or mitigation measures would be implemented. No mitigation measures would be implemented to correct existing problems. Mainstem Wenatchee and Entiat River systems would not be measurably affected by fine sediment from these tributaries due to the small contribution of flow from these small tributaries.

Alternative 2

This alternative would reduce the total acres grazed by about 1,800 acres. In addition, wetlands would have a 300 foot 'no grazing' buffer to protect them from degradation. Grazing would continue to occur on about 5,681 acres of riparian reserves. Streamside access points would be hardened with rock or wire mesh screen to minimize erosion sites that drain directly into stream systems. Also, bedding sites that are responsible for introducing sediment into creeks would be closed. These include seven sites in the

Eagle/Blagg allotment that have severe erosion and/or sediment delivery. Another two sites would be relocated further from streams or drainages to decrease fine sediment delivery to stream systems. In Switchback/ Limekiln there are five bedding sites that would be closed and another ten that would be relocated farther from the stream systems. Mosquito Ridge has two sites that would be closed and moved away from the stream systems, one site that would be confined to the ridge out of a draw, and two sites that would be monitored and reviewed that are near streams.

Bedding sites that would be closed would be rehabilitated and revegetated where sediment delivery to stream courses is occurring.

Measures common to all Action Alternatives (detailed in Chapter 2), combined with the hardening of watering sites and crossing would minimize and eliminate much of the fine sediment that is currently eroding into stream systems as a result of grazing.

Alternative 3

This alternative would close the Eagle/Blagg allotment, close a third of the Switchback allotment and close over half of the Mosquito Ridge allotment. The other open areas would be managed the same as Alternative 2. This alternative has less of a potential for fine sediment to enter the stream systems (then Alternatives 1 and 2) because closed allotments or portions of allotments and the mitigation measures as applied in Alternative 2. There would be a short term (2-5 years) effect of fine sediment entering the streams from these unrehabilitated sites, but in the long term, these sites would be revegetated naturally and would reduce fine sediment from entering the stream.

Alternative 4

This alternative would close all allotments to grazing and would have the least potential for fine sediment to enter the stream systems on the long term. However, rehabilitation of any sites that are currently eroding would not take place in the next five years and would be left to revegetate by themselves. There would be a short term (2-5 years) effect of fine sediment entering the streams from these sites. In the long term, these sites would be revegetated naturally and would reduce fine sediment from entering the stream.

Key Issue #2 - Grizzly Bear

Q. How would the implementation of the alternatives affect the potential for grizzly bears to become habituated to human foods or be attracted to livestock carcasses?

Environmental Effects

Alternatives 1, 2, 3, and 4

All alternatives would be consistent with the management situation guidelines and the interim sanitation guidelines for the North Cascades Grizzly Bear Ecosystem. These include managing human foods in campsites to reduce their availability to bears and the proper disposal of livestock carcasses in order to reduce the potential for human/bear conflicts.

Q. How would the implementation of the alternative affect the potential for mortality of grizzly bears as a result of predator control actions?

All Alternatives

None of the alternatives would authorize any predator control activities that are within the jurisdiction of the Forest Service to address.

Q. How would the implementation of the alternative effect the potential for depredation of livestock to occur by grizzly bears?

Alternative 1

This alternative would have the greatest potential for depredation of livestock by grizzly bears because this alternative would graze the greatest numbers of sheep. However, the low number of grizzly bears within the North Cascades Ecosystem (Almack et al. 1993) reduces the potential for depredation to occur.

Alternative 2

This alternative would reduce the potential for depredation of livestock by grizzly bears because this alternative includes a minor reduction in sheep numbers in order to address other resource issues. The low number of grizzly bears within the North Cascades Ecosystem (Almack et al. 1993) reduces the potential for depredation to occur.

Alternative 3

This alternative would reduce the potential for depredation of livestock by grizzly bears because this alternative includes about a 66 percent reduction in sheep numbers within the allotments, and includes the elimination of the Eagle-Blagg allotment and a reduction in the size of the Switchback and Mosquito Ridge allotments. The low number of grizzly bears within the North Cascades Ecosystem (Almack et al. 1993) reduces the potential for depredation to occur.

Alternative 4

This alternative would eliminate the risk of depredation of sheep by grizzly bears because no grazing would occur.

Q. How would the implementation of the alternatives affect the availability of core areas for grizzly bears (see Table 1 for a summary)?

Alternative 1

The implementation of this alternative would continue to permit grazing within 12 percent of the early season and 11 percent of the mid/late season core areas within the Lower Wenatchee BMU, 1 percent of the early and mid/late season core areas within the Chiwawa BMU, and <1 percent of the early and late season core areas within the Lower Entiat BMU. In addition, the quality of important habitats such as riparian areas and meadows would not be restored.

Alternative 2

The implementation of this alternative would permit grazing within 12 percent of the early season and 11 percent of the mid/late season core areas within the Lower Wenatchee BMU, 1 percent of the early and mid/late season core areas within the Chiwawa BMU, and <1 percent of the early and mid/late season core areas within the Lower Entiat BMU. Important habitat for grizzly bears such as meadows and riparian areas would be restored by relocation of unloading and bedding areas, and travel routes.

Alternative 3

The implementation of this alternative would permit grazing within 9 percent of the early season and 8 percent of the mid/late season core areas within the Lower Wenatchee BMU, 1 percent of the early and mid/late season core areas within the Chiwawa BMU, and <1 percent of the early and mid/late season core areas within the Lower Entiat BMU. Important habitat for grizzly bears such as meadows and riparian areas would be restored by relocation of unloading and bedding areas, and travel routes.

Alternative 4

The implementation of this alternative would not permit grazing within the core area within the Lower Wenatchee BMU, Chiwawa BMU, or Lower Entiat BMU. Important habitat for grizzly bears such as meadows and riparian areas would be restored by removal of the sheep grazing.

Summary of the Current Condition and Potential Affects of Sheep Grazing on the Core Areas within the Bear Management Units.

	Percent of Core Area Affected by Alternative			
Bear Management Unit	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Lower Wenatchee BMU				
Early Season	12	12	9	0
Mid/Late Season	11	11	8	0
Chiwawa BMU				
Early Season	1	1	1	0
Mid/Late Season	1	1	1	0
Lower Entiat BMU				
Early Season	<1	<1	<1	0
Mid/Late Season	<1	<1	<1	0

Key Issue #3 - Bighorn Sheep

Q. How would the implementation of the alternatives affect the potential for competition for forage between domestic and wild sheep?

Important Interactions

California bighorn sheep (*Ovis canadensis californiana*) were native to eastern Washington, but population declines in the later half of the nineteenth century lead to their extirpation by about 1935. The decline in bighorn sheep populations throughout the west coincides with the arrival of domestic sheep (Johnson 1983). The spread of disease from domestic to wild sheep (Foreyt 1989, Onderka and Wisehart 1983) and competition for forage are probable causes of these declines.

The Washington Department of Game relocated California bighorn sheep from British Columbia to Washington in 1957 in a reintroduction effort. The initial reintroduction effort into the Swakane area occurred in 1969 when nine California bighorns from the Sinlahekin Habitat Management Area were released (WDFW 1995). The herd grew to 20 animals within a few years, but then population growth leveled off throughout the 1970s. By 1980, the herd had increased slowly to about 30 animals. An additional ram was released into the area in 1987 from Northwest Trek Wildlife Park. The most recent population estimate for the Swakane herd is 35 to 40 sheep.

Domestic sheep have been shown to spread fatal pneumonia to bighorn sheep (Foreyt and Jessup 1982, Onderka and Wishart 1888, Foreyt 1989, Callan et al. 1991). In 1994, eight of nine sheep that were tested for *Pastureurella haemolytica* were positive. Whether this was spread from domestic sheep is unknown but suspected (WDFW 1995).

Environmental Effects

Alternative 1

The implementation of this alternative would result in the allocation of 45% of the available forage within the primary range to domestic sheep and 55% to wildlife and the maintenance of ecosystem structure and functions. The degree of competition for forage between domestic and bighorn sheep was assessed based upon the amount of overlap between domestic and wild sheep ranges, and the number of domestic sheep. The implementation of this alternative would result in 60% of the area within the domestic sheep grazing allotments overlapping with the bighorn sheep range. This alternative would have the greatest number of sheep that would be permitted to graze the allotments. It is unlikely however, that the level of forage consumed by the domestic sheep within the bighorn sheep range would result in any shortage of forage for bighorn sheep

Alternative 2

The implementation of this alternative would result in the allocation of 40% of the available forage within the primary range to domestic sheep and 60% to wildlife and the maintenance of ecosystem structure and functions. The degree of competition for forage between domestic and bighorn sheep was assessed based upon the amount of overlap between domestic and wild sheep ranges, and the number of domestic sheep.

The implementation of this alternative would result in 60% of the area within domestic sheep allotments overlapping with the bighorn sheep range. This alternative would result in a minor reduction in the number of sheep grazed to address other resource issues. It is unlikely however, that the level of forage consumed by the domestic sheep within the bighorn sheep range results in any shortage of forage for bighorn sheep.

Alternatives 3 and 4

The implementation of these alternatives would result in the allocation of 40% of the available forage within the primary range to domestic sheep and 60% to wildlife and the maintenance of ecosystem structure and functions. The degree of competition for forage between domestic and bighorn sheep was assessed based upon the amount of overlap between domestic and wild sheep ranges, and the number of domestic sheep. The implementation of these alternatives would result in no overlap between the domestic sheep allotments and the bighorn sheep range.

Q. How would the implementation of the alternatives affect the potential for disease to spread from domestic to bighorn sheep?

Alternative 1

The implementation of this alternative would not reduce the potential for the spread of disease from domestic sheep to bighorn sheep. The risk of spread would remain high as domestic sheep grazing would continue to occur within the bighorn sheep core use area (WDFW 1995, Hein 1996) and 60% of the area within the domestic sheep allotments would overlap with the bighorn sheep range.

Alternative 2

The implementation of this alternative would reduce the overlap between the domestic sheep and the bighorn sheep core use area (WDFW 1995, Hein 1996). However the risk of the spread of disease would still remain at a high level because 60% of the area within the domestic sheep allotments would overlap with the bighorn sheep range.

Alternative 3

This alternative would have no overlap between the domestic sheep and the bighorn sheep core use area (WDFW 1995, Hein 1996). However, there would not be any buffer zone between domestic sheep and bighorn sheep to reduce the potential for incidental contact between the species. Therefore, the risk of the spread of disease from domestic to wild sheep would be moderate.

Alternative 4

The implementation of this alternative would eliminate the risk of the spread of disease from domestic sheep grazing on National Forest Lands to bighorn sheep as sheep grazing would not be permitted within the allotments. A risk from domestic sheep on private land is still present, however it is considered to be slight.

Environmental Effects

All Alternatives

After completing allotment forage capacity assessment, it is apparent that there is ample forage capacity within the four range allotments. The current practices of loose herd grazing appears not to have had an adverse effect on range condition or rangeland health. Hence, for Alternatives 1 and 2 sustainable carrying capacity is not an issue. With Alternative 3 and 4, allotment acreage is drastically reduced because of bighorn sheep concerns. Adjusted grazing seasons for Alternative 3 are still well within range capacity. Range carrying capacity determinations are contained in Appendix C.

Alternative 1

Alternative 1 would continue the same level of sheep grazing as authorized in the existing Federal permit. On and off dates would remain the same, as well as the season of use. The four allotments would not be adjusted and total acres would remain at 65,166. Three sheep bands would be authorized on four allotments for a total of 8,554 animal months. The existing grazing strategy (travel routes and bedding grounds) would continue as described in the 1998 Annual Operation Plan.

Sustainable Carrying Capacity. There is ample forage produced annually to support the grazing strategy of Alternative 1.

Alternative 2

Alternative 2 would be a slight modification from the No Action Alternative. Alternative 2 would result in a reduction of grazing for approximately five days. These reductions in grazing season would be necessary to reduce potential adverse effects to bighorn sheep, clustered lady slipper (*Cyprispedium fasciculatum*), and rehabilitation off bedding grounds. Approximately 1,300 acres would be closed to domestic sheep grazing that borders the Swakane Watershed Divide. Another 300 acres would be closed to reduce grazing pressure on Cluster lady slipper in lower Eagle Creek. Eight bedding grounds would be closed to improve vegetation cover and reduce surface erosion. These closures would require relocating new grazing routes and bedding grounds, and would be identified in future annual operating plans prior to the 1999 grazing season.

The Eagle-Blagg Allotment would be adjusted and the total available acres for the four allotments would decline from 65,166 to 63,399 acres. These sheep bands would be authorized on four allotments for an adjusted total of 8,370 annual mouths, which is a reduction of 184 animal mouths, a ten percent reduction. The relocation of bedding sites would change grazing strategies linked to travel routes.

Sustainable Carrying Capacity. There is ample forage produced annually to support the grazing strategy identified in Alternative 2.

Alternative 3

Alternative 3 would result in a reduction of grazing of approximately 161 days. These reductions in the grazing season would be necessary to reduce potential adverse

effects from an expanded bighorn sheep herd. Currently, the bighorn sheep herd is approximately 25 adult animals, which is not a genetically viable herd number. The bighorn sheep herd would have to be augmented to 50-60 adult animals to be genetically viable. This increase in herd size would cause more juvenile animals to venture out of the Swakane Watershed; hence, the domestic sheep grazing adjacent to the Swakane Watershed would have to be reduced in order to effectively reduce the risk of disease transfer.

Approximately 33,680 acres would no longer be available for domestic sheep grazing. Grazing on the Eagle-Blagg allotment would be completely restricted; grazing on 32 percent of the Switchback Allotment would be restricted; and 39 percent of the Mosquito Ridge Allotment would be restricted. This would mean that the four allotments would have to be drastically adjusted. Closing an allotment permanently is outside the Forest Supervisor's authority and would require an amendment to the Forest Plan, which would require approval by the Regional Forester.

Two sheep bands would be terminated for a total of 2,100 ewes, leaving only one sheep band totalling 1,00 ewes. Animal mouths of grazing would decline from 8,554 animal mouths to 2,930, or a reduction of 66 percent. The existing grazing strategy would change drastically. New grazing travel routes and camp/bedding grounds would need to be identified.

Sustainable Carrying Capacity. There is ample forage produced annually to support the grazing strategy identified in Alternative 3.

Alternative 4

Alternative 4 would be a total elimination of all permitted livestock grazing in all four allotments. These reductions would be necessary to provide a 9 miles buffer around an augmented bighorn sheep herd in the Swakane Watershed. This increase in herd size would cause more animals dispersing from the core herd. Hence, the domestic sheep grazing would be terminated to reduce risk of disease.

Approximately 65,166 acres would no longer be available for domestic sheep grazing. Permanent closure of allotments is outside the Forest Supervisor's authority and would need to be forwarded to the Regional Forester.

Range Forage Production (pounds)***			
Allotments	All lands- Federal & Private	Sustainable Range* Federal	Primary Federal Land**
Alternative 1			
Eagle-Blagg	13,807,454	11,376,530	7,670,746
Limekiln	8,251,693	6,777,722	4,150,240
Mosquito	11,868,378	6,777,465	5,908,849
Switchback	8,517,320	4,568,879	3,162,091
Alternative 2			
Eagle-Blagg	12,691,774	10,994,289	7,311,715
Limekiln	8,250,693	6,777,722	4,150,240
Mosquito	11,858,378	6,777,465	5,908,849
Switchback	7,045,368	4,272,165	3,133,616
Alternative 3			
Limekiln	8,251,693	6,598,092	3,664,111
Mosquito	2,891,492	2,659,948	1,908,791
Switchback	5,233,195	2,779,825	2,486,377

*Suitable range represents those acres within the allotment that could be accessed by the permitted livestock and supports the necessary forage to sustain grazing.

**Primary range represents those acres within the allotment that are preferred by the permitted livestock and are considered to be key use areas.

***1998 clipping studies were used to help identify production per acre within the analysis area. Forage is considered the edible portion of the total herbage that is produces annually. The production data is listed as pounds of dry forage.

Allotment Capacity						
	Season (months)	Permitted Livestock	Head Months	Forage Requirements (pounds)	Available Forage (pounds)	Allotment Forage Utilization (pounds)
Alternative 1						
Eagle-Blagg	2.267	1,100	2,494	598,560	3,068,300	20% 613,660
Limekiln	1.9	1,000	1,900	456,000	1,660,100	27% 448,227
Mosquito	3.63	1,000	3,630	871,200	2,363,500	37% 874,495
Switchback	.53	1,000	530	127,200	1,264,800	10% 126,480
Alternative 1						
Eagle-Blagg	2.1	1,100	2,310	554,400	2,924,700	19% 555,693
Limekiln	1.9	1,000	1,900	456,000	1,660,100	27% 448,227
Mosquito	3.63	1,000	3,630	871,200	2,363,500	37% 874,495
Switchback	.53	1,000	530	127,200	1,253,400	10% 125,340
Alternative 1						
Eagle-Blagg						
Limekiln	1.9	1,000	1,900	456,000	1,465,600	31% 454,336
Mosquito	.5	1,000	500	120,000	763,500	16% 1222,160
Switchback	.53	1,000	530	127,200	994,600	13% 129,298

Season (months) - the season of use converted to the number of months based on a 30-day month.

Permitted livestock - the number of permitted sheep authorized by a permit to graze the National Forest. The permitted numbers are based upon the total numbers of adult ewes.

Head months - is the figure derived from multiplying the season of use times the number of permitted livestock. Head months identifies the amount of grazing use in any given year. Head months is and important calculation for determining rangeland capacity and for billing purposes.

Forage requirement - is the amount of forage necessary to sustain the total number of sheep for the entire grazing season. This is a vital element necessary to determine rangeland capacity and is calculated by multiplying the total head months times the amount of forage consumed by an adult ewe during one month. An adult ewe normally will consume approximately 240 pounds of forage per month.

Available forage - is the amount of annual forage production that is allocated to permitted livestock. According to the Wenatchee Forest Plan Standards, only 40 percent of annual forage production will be available to permitted livestock and the remaining 60 percent will be allocated to wildlife and watershed values.

Allotment Forage Utilization - is a comparison (percentage) of the forage required to sustain permitted livestock and the amount that is available. This column represents the amount of the Wenatchee National Forest Utilization Standard that will be utilized to sustain the permitted livestock.

Q. How would alternative implementation affect ground cover in Riparian Reserves?

Environmental Effects

Alternative 1

This alternative would allow for continued bedding at sites within 200 feet of streams/riparian areas without mitigation measures. Currently there are at least nine such sites in the Eagle/Blagg allotment, at least sixteen such sites in the Switchback/ Limekiln Allotments, and at least four such sites in the Mosquito Ridge allotment. Location of bedding sites within 200 feet of streams or riparian areas would concentrate sheep and browsing in these areas, greatly increasing the risk for a decrease in riparian reserve ground cover. Stream crossing/watering sites would not be protected under this alternative and there will continue to be a decrease in riparian ground cover at these sites. There are approximately 5681 acres of riparian reserves that would be open to grazing under this alternative, all of which could see a decrease in riparian ground cover resulting from grazing.

Alternative 2

This alternative would decrease allotment size by approximately 1,800 acres. This small decrease in size would primarily effect upslope acres but would eliminate domestic grazing on approximately 54 riparian acres which would not see a reduction in riparian ground cover due to grazing. Bedding sites within 200 feet of stream courses would be closed, moved, or require application of mitigation measures. Throughout the allotments, this would represent closure/moving or mitigation measures on at least 29 bedding sites which would reduce domestic grazing of these sites and would hence decrease the amount of riparian ground cover in riparian areas removed through domestic grazing.

This alternative would decrease the riparian reserves subject to potential grazing by 54 acres all of which would see a reduction in the amount of riparian ground cover utilized through domestic grazing. Wetlands would have a 300 foot no grazing buffer which would eliminate reduction of riparian ground cover due to domestic grazing.

Stream crossing/watering sites that are currently lacking riparian sufficient riparian ground cover to provide bank stability and minimize erosion would be armored with concrete grid pavers. While this would not necessarily increase riparian ground cover at these locations, the pavers would provide many of the same benefits that vegetation would, including stream bank stabilization and erosion control.

In addition Forest Plan Riparian Vegetation standards require a minimum of 90% ground cover provided by trees, shrubs, grasses, sedges, and duff within the floodplain/true riparian zone. Enforcement and attainment of this standard would be sufficient to maintain viable riparian ground and ground cover functions within the riparian area.

Alternative 3

Under Alternative 3 approximately 33,680 acres would be closed to domestic sheep grazing. There would be approximately 2,741 riparian acres that would not see domestic grazing pressure, and hence would not see reductions in riparian ground cover due to domestic grazing. Furthermore, mitigation measures and standards as listed in Alternative two would also be employed under this alternative, allowing for maintenance of riparian ground cover and function on those acres that would continue to see domestic grazing.

Alternative 4

Cessation of grazing activity under this alternative would eliminate decreases in riparian ground cover resulting from domestic grazing. With the elimination of domestic grazing, riparian ground cover in sites that have been impacted would recover within ten years.

Issue #6 - Stream Bank Stability

Q. How would implementation of the alternatives affect stream bank stability throughout the allotments but particularly at stream crossings, loading and unloading sites and bedding areas?

Environmental Effects

Alternative 1

This alternative would maintain the current condition with some stream banks unstable due to grazing activities, namely those areas adjacent to bedding sites or watering sites. Fine sediment at these specific sites would continue to erode from these unstable banks and riparian vegetation associated with these banks would continue to be degraded. There is some potential for stream channel degradation or change due to downcutting of the channel at these locations or directly downstream. Bank instability can contribute to this channel degradation.

Alternative 2

This alternative would harden the watering sites to maintain bank stability, and move or close sites that are currently degrading the riparian areas/bank stability. This alternative would improve and rehabilitate stream bank stability at site specific locations.

Alternative 3

This alternative would provide for additional bank stability over Alternative 2 because of the closure of the Eagle/Blade allotment and portions of the Switchable and Mosquito Ridge allotments, and the mitigation measures outlined above. Short term effects would include continued erosion and bank degradation since no rehabilitation measures would be implemented. Long term, bank stability would be increased as vegetation would be allowed to grow unhindered and banks would become stable over time.

Alternative 4

This alternative would provide the most for long term bank stability since grazing would be closed on all four allotments. Short term effects would include continued erosion and bank degradation since no rehabilitation measures would be implemented. Long term,

bank stability would be increased as vegetation would be allowed to grow unhindered and banks would become stable over time.

Issue #7 - Fish Habitat and ETS Fish Species

Q. How would implementation of the alternatives effect species and associated habitat?

Environmental Effects

Alternative 1

No PETS fish inhabit the Eagle/Blagg or Switchback allotments due to migrational barriers off the National Forest. Therefore, continued management of these two allotments as currently run would have no effect on PETS fish. Resident fish and fish habitat would continue as currently managed. Current amounts of fine sediment from grazing would continue to be input to the stream, although actual amounts are unknown it would be expected to be very small due to the limited, site specific locations at loading/unloading sites, stream crossings, and bedding sites. Sediment loads in all streams are above standards in these two allotments and the volume of material that might be put into the larger systems that listed species inhabit would be inconsequential. Impacts on resident fish and their habitat would likely be site specific to stream crossings, and bedding sites. There would be no effect on large woody debris from continued grazing since trees and existing large woody debris is not effected by grazing in these allotments.

The Limekiln and Mosquito Ridge allotments and associated drainages contain spring chinook, steelhead, and bull trout. Limekiln is associated with the Beaver Creek drainage where steelhead are likely to inhabit and where bull trout have been seen. However, all crossings of the stream are located on roads and no loading/unloading sites are located on Forest land. Habitat impacts would be limited to potential for fine sediment from watering sites which has been covered in Issue 1. There would be no affect to large woody debris or channel stability in these allotments.

The Mosquito Ridge allotment and associated tributaries contain steelhead, bull trout, cutthroat trout, and spring chinook salmon. Similar to the Limekiln allotment, potential areas of concern are limited to site specific crossings or watering sites. Habitat impairment from fine sediment entering the stream systems at these locations is a possibility (see fine sediment discussion). Other habitat elements of large woody debris, pools, and channel stability are unlikely to be effected by this action. This is also true of other species of fish in these systems. Effects would be limited to site specific areas and would not affect species as a whole, but may affect some habitat from fine sediment input.

Alternative 2

Because of the mitigation measures implemented above, fish species and habitat would be improved due to decrease amounts of bank erosion and fine sediment at loading/ unloading sites, watering sites, stream crossings, and bedding sites.

Alternative 3

This alternative would provide for better habitat for resident species on the long term due to a closing of the Eagle/Blagg and portions of the Switchback and Mosquito Ridge allotments and mitigation measures. Short term impacts could result from the lack of rehabilitation of old sites in the closed portions until they are rehabilitated.

Alternative 4

This alternative would have the best long term effect on fish and habitat since all grazing would closed. Short term impacts of erosion from unrehabilitated sites would continue for about 2-5 years until those sites area revegetated.

Issue #8 - Water Quality

Alternative 1

Alternative 1 would pose the greatest risk to water quality within the allotments. Currently there are 28 bedding sites within 200 feet of streams that would likely experience increased soil compaction, soil exposure, and possibly a decrease in riparian vegetation. These sites would be likely to contribute fine sediment from accelerated erosion, thus decreasing water quality downstream of the sites.

As mentioned, there is the potential for a decrease in riparian vegetation on bedding sites within 200 feet of stream courses. Decreases in riparian vegetation carries with it a small chance for increasing stream temperatures by removing shading. However, sheep grazing would only remove the lowest shade providing cover, so this risk is deemed small.

Bedding sites near stream courses would concentrate animal waste in and adjacent to stream courses which would increase the risk for contamination and water quality degradation.

Alternative 2

Moving, closing or applying mitigation measures to the 29 bedding sites that are within 200 feet of stream courses would prevent additional compaction of these sites resulting from grazing, decrease soil exposure and allow for increased vigor of riparian vegetation. This would likely result in a decrease in fine sediment from these sites and would minimize grazing induced water quality problems that result from these sites.

Because vegetation would no longer be grazed at these sites, shading benefits would increase. Increases in shading would prevent increases in stream temperature resulting from grazing at sites to be closed or moved.

Likewise, removal of sheep from these sites would eliminate the chance for concentrated animal waste input into streams and decrease the risk for water quality problems that may result.

Alternative 3

Closure of the Eagle/Blagg allotment, approximately one third of the Switchback Allotment, and over half of the Mosquito Ridge Allotment would greatly decrease new grazing related compaction, and erosion. Consequently, the risk of fine sediment input

to drainages and stream courses would be greatly reduced. Furthermore, mitigation measures listed in Alternative 2 would continue, further reducing their risk of fine sediment delivery and water quality decreases resulting from grazing

Cessation of grazing on these acres would greatly reduce utilization of riparian vegetation. Again, increased shading would prevent increases in stream temperatures resulting from grazing

Water quality problems arising from concentration of animal waste would be greatly reduced under this alternative.

Alternative 4

Complete cessation of grazing activities would eliminate long term grazing related erosion, eliminate new grazing related compaction, and eliminate grazing related decreases in shade providing riparian vegetation. Consequently, there would be no decreases in water quality resulting from grazing under this alternative.

Issue #9 - Soil Compaction/Hill Slope Erosion

Environmental Effects

Alternative 1

This alternative would have the highest risk for grazing related soil compaction and hillslope erosion. Grazing would continue on approximately 65,167 acres, over a span of approximately 250 days. Existing bedding sites that display grazing related effects of compaction and accelerated erosion would continue in their present state of degrade.

Alternative 2

Accelerated erosion due to grazing would be reduced under Alternative 2. Reduction of allotment size by approximately 1,800 acres and restricting routing to avoid sites susceptible to erosion would reduce erosion by physically decreasing the amount of ground subject to compaction and baring of soil. This alternative would close seven bedding sites that are currently experiencing erosion or are within 200 feet of streams, close/move an additional five bedding sites, and apply mitigation measures to an additional 21 bedding sites. This would set the stage for decreased erosion as vegetation becomes re-established. Removal of bedding sites would reduce the number of days permitted for grazing by five days, allowing for a small reduction in the amount of grazing related compaction and erosion on trailing ground. Furthermore, criteria established for current and future bedding sites would greatly reduce the chance of accelerated erosion by:

- Limiting bedding sites to slopes less than 30 percent which would serve to decrease runoff energies and hence erosion.
- Requiring bedding sites to occur on ridge tops or previously hardened sites. Ridge top sites generally have gentler topography and again develop lower runoff energies. Previously hardened sites would be largely impervious to impact from sheep.
- Limiting bedding site stays to 2 nights or less. This would limit the impact the sheep would have on any one site.

If a site must be within 200 feet of a stream course, criteria such as corralling on hardened sites, maximum slope of 10 percent, and maintenance of Forest Plan Riparian Vegetation Standards would serve to minimize grazing related erosion from these sites.

Alternative 3

The chance for increases in grazing related compaction, and grazing related erosion would be greatly reduced by closing the Eagle/Blagg Allotment, approximately one third of the Switchback Allotment, and over half of the Mosquito Ridge Allotment as called for in Alternative 3. This represents a decrease in approximately 33,680 acres available for domestic grazing. Reduction in acres would reduce the time grazing is permitted by approximately 161 days, leading to a large reduction in the amount of grazing related compaction and hillslope erosion. Mitigations as listed in Alternative 2 of sites that would continue to be used would serve to limit grazing related erosion from these sites. It is unlikely that sites not used under this alternative would receive much rehabilitation, so these sites would continue to see accelerated erosion until vegetation is naturally re-established. Minimal compaction resulting from grazing would be expected on the 26,484 acres remaining opening to grazing.

Alternative 4

Cessation of grazing activities under alternative 4 would eliminate long term grazing related erosion. Short term erosion would continue much like described under Alternative 3. No new grazing related compaction would occur and slow decrease in grazing related compaction would be expected over the very long term (multi-decades).

Issue #10 - Gray Wolves and Wolverines

Q. How would the implementation of the alternatives affect the potential for mortality of gray wolves and wolverines as a result of predator control?

Environmental Effects

All Alternatives

None of the alternatives would authorize any predator control activities that are within the jurisdiction of the Forest Service to address.

Q. How would the implementation of the alternatives affect the potential for depredation of livestock to occur by gray wolves or wolverines?

Alternative 1

This alternative would have the greatest potential for depredation of livestock by gray wolves or wolverines because this alternative would not result in a reduction in the number of sheep grazed. The low number of gray wolves and wolverines within the North Cascades reduces the potential for depredation to occur.

Alternative 2

This alternative would have the second highest potential for depredation of livestock by gray wolves or wolverines because this alternative would result in a minor reduction in

the number of sheep. The low number of gray wolves and wolverines within the North Cascades reduces the potential for depredation to occur.

Alternative 3

This alternative would have the second lowest potential for depredation of livestock by gray wolves because this alternative includes about a 50 percent reduction in the numbers of sheep grazed, and includes the restriction of grazing in the Eagle-Blagg portion of the Switchback and Mosquito Ridge allotments. The low number of gray wolves and wolverines within the North Cascades reduces the potential for depredation to occur.

Alternative 4

This alternative would eliminate the risk of depredation of sheep by gray wolves or wolverines because no grazing would occur.

Q. How would the implementation of the alternatives affect the availability of security habitat for gray wolves and wolverines?

Alternative 1

The implementation of this alternative would result in grazing by sheep within 11,200 acres of the security habitat that are available for gray wolves and wolverines within the three watersheds in which the project is located.

Alternative 2

The implementation of this alternative would result in grazing by sheep within 8,300 acres of the security habitat that is available for gray wolves and wolverines within the three watersheds in which the project is located.

Alternative 3

The implementation of this alternative would result in grazing by sheep within 3,500 acres of the security habitat that is available for gray wolves and wolverines within the three watersheds in which the project is located.

Alternative 4

The implementation of this alternative would result no grazing by sheep within the security habitat that is available for gray wolves and wolverines within the three watersheds in which the project is located.

Issue #11 - Riparian Dependent Wildlife Species

Q. How would the implementation of the alternative affect riparian habitat for riparian dependent species? (see following table)

Environmental Effects

Alternative 1

The implementation of this alternative would not result in changes to grazing practices within the allotments, that would allow the recovery of riparian areas and the protection

of wetlands. Grazing would continue to occur within all allotments which includes about 5681 acres of riparian reserves.

Alternative 2

The implementation of this alternative would result in changes to grazing practices within the allotments that would allow the recovery of riparian areas and protection of wetlands by a 300 foot no grazing buffer. Grazing would continue to occur within all allotments which includes 5,627 acres of riparian reserves that could still potentially be impacted by sheep unless they are closely monitored.

Alternative 3

The implementation of this alternative would result in changes to grazing practices within the allotments that would allow the recovery of riparian areas and the protection of wetlands by a 300 foot no grazing buffer. Grazing would be eliminated from the Eagle/Blagg allotment, and portions of the Switchback and Mosquito Ridge allotments. This would reduce the area of riparian reserves within grazed allotments to 2,941 acres, which could still potentially be impacted by sheep unless they are closely monitored.

Alternative 4

The implementation of this alternative would not permit grazing within any of the allotments, eliminating the effects of grazing on about 5,681 acres of Riparian Reserves.

Riparian Habitat Open to Sheep Grazing (acres)				
Allotment	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**
Eagle-Blagg	1,819	1,772	closed (2,739)	0
Limekiln	1,819	1,819	1,819	0
Mosquito Ridge	1,157	1,157	520	0
Switchback	886	878	602	0
Totals	**5,681**	**5,626**	**2,941**	**0**

Issue #12 - Survey and Manage Wildlife Species

Q. Would the implementation of the alternative be consistent with the management direction for survey and manage species in the Northwest Forest Plan?

Environmental Effects

All Alternatives

The implementation of any of the alternatives would be consistent with the management direction for survey and manage wildlife species based upon the following information: (1) surveys for mollusks were completed during the fall of 1998 and spring of 1999; (2) the project area lies outside of the known range and survey area of the larch mountain salamander; (3) no surveys for the great gray owl were conducted because of limited potential for negative effects of grazing on great gray owls and/or their habitat; and (4)

management protocols for the protection of survey and manage sites were followed for all species locations that were known or discovered during the surveys.

Issue #13 - Mule Deer and Elk

Q. How would the implementation of the alternative affect the potential for competition for forage between domestic sheep, deer and elk?

Environmental Effects

Alternative 1

The implementation of this alternative would allow for up to 45 percent of the available forage to be allocated for domestic sheep and 55% for wildlife and ecosystem maintenance. This alternative would not allow for the full recovery of all important wildlife habitats such as riparian areas and wetlands that provide forage for mule deer and elk. The table below summarizes information used to develop a model to predict the potential competition for available forage between wildlife and domestic ungulates. These models suggest that even under the heaviest grazing alternative ample forage would be available for both domestic and wild ungulates. For example, under this alternative about 27 to 59 percent of the forage could be consumed by wild ungulates, 25 percent for domestic ungulates, leaving 16 to 48 percent for other ecosystem functions.

Alternatives 2 and 3

The implementation of these alternatives would result in the allocation of 40 percent of the forage for domestic sheep and 60 percent of the forage for wildlife and the maintenance of ecosystem structures and functions. These alternatives would also provide for the restoration of riparian areas and the protection of wetlands that provide forage for mule deer and elk. The amount of available forage within the primary range indicates that forage is not a limiting factor for any of these species and that the level of forage consumed by domestic sheep would not result in any shortage of forage for mule deer or elk. The table below summarizes information used to develop a model to predict the potential competition for available forage between wildlife and domestic ungulates. These models suggest that even under the heaviest grazing alternative ample forage would be available for both domestic and wild ungulates.

Alternative 4

The implementation of this alternative would result in the elimination of any competition for forage between domestic sheep and, mule deer and elk as grazing would no longer occur within any of the allotments.

Models for Assessing Forage Competition between Domestic and Wild Ungulates within Grazing Allotments.		
Parameters	**Model 1**	**Model 2**
Number of Wild Ungulates (1)	1500	2000
Mean Weight of Wild Ungulates	150 lbs.	150 lbs.
Forage Consumption (3)	1.894 kg/animal/day	3.078 kg/animal/day
Number of days	365	365
Forage Competition (lbs/year)		
Wild Ungulate Consumption	2,281,323	4,943,268
Domestic Sheep Consumption*	2,052,960	2,052,960
Total Ungulate Consumption	4,334,283	6,996,228
Total Available	8,356,700	8,356,700
Forage Remaining	4,022,417	1,360,472

Issue #14 - LSR/MLSA/Late-Successional Wildlife Species

Q. How would the implementation of the alternative affect late-successional wildlife species and their habitats and would the implementation of the alternative be consistent with the Wenatchee National Forest Late-successional Reserve Assessment?

Environmental Effects

Alternative 1

The implementation of this alternative would not result in any changes to grazing practices that would better protect riparian and unique habitats within the allotments. In addition, this alternative would result in sheep grazing over the largest amount of area and the greatest risk of the spread of noxious weeds into late-successional habitats, riparian reserves and unique habitats. All of the security habitat for late-successional species within the Eagle MLSA and 3% within the Chiwawa LSR would be within a grazing allotment.

Alternative 2

The implementation of this alternative would result in changes to grazing practices that would better protect riparian and unique habitats within the allotments. In addition, this alternative would reduce the areas that are grazed by about 1,000 acres and reduce the risk of the spread of noxious weeds into late-successional habitats, riparian reserves and unique habitats. All of the security habitat for late-successional species within the Eagle MLSA and 3% within the Chiwawa LSR would be within a grazing allotment.

Alternative 3

The implementation of this alternative would result in changes to grazing practices that would better protect riparian and unique habitats within the allotments. In addition, this alternative would reduce the areas that are within allotments and could be grazed by about 32,000 acres and reduce the risk of the spread of noxious weeds into late-successional habitats, riparian reserves and unique habitats. None of the security habitat for late-successional species within the Eagle MLSA and 3% within the Chiwawa LSR would be within a grazing allotment.

Alternative 4

The implementation of this alternative would not permit grazing within any of the allotments which would eliminate the impacts of grazing on riparian areas, unique habitats, the spread of noxious weeds, and on security habitat for late-successional wildlife species.

Issue #15 - Endangered, Threatened, and Sensitive Plant Species

Q. How would alternative implementation of the proposed project affect PETS plant species present within the planning area?

Review of the 1997 Natural Heritage Database, current Forest Service records and intensive "on the ground" surveys have revealed that the following PETS plant species occur within the planning area: *Cypripedium fasciculatum* (clustered ladyslipper); *Orobanche pinorum* (pine broomrape); and *Iliamna longisepala* (globe mallow).

Important Interactions

The current base of knowledge regarding these species biology, life history and response to disturbance varies widely. The effects of disturbance are currently being examined for a number of the PETS plant species known to occur within the planning area. The following discussion examines each of the three sensitive species found within the planing area. The purpose of this is to describe what is known about the biology and ecology of these species, including response to disturbance.

Orobanche pinorum is an obligate root parasite that appears to use *Holodiscus discolor* (oceanspray) exclusively as its host (Ellis 1996). This is an annual species, which means it completes its entire life cycle within one year. This species was recently removed from the Washington Natural Heritage List of Endangered, Threatened and Sensitive plant species, and is proposed for removal from the new Regional Forester's list, due to the abundance of known occurrences and a better understanding of this species biology and life history. Research has shown that *O. pinorum exploits* established populations of *H. discolor* in relatively dry, open environments. Ellis (1996) suggests that *O. pinorum* does not do well in shadier environments because their growth may in large part be determined by the amount of effective transpiration. The ability to transpire at rates higher than those of their host plant allows *O. pinorum* to draw large amounts of water and nutrients from the host. Transpiration rates are higher in dry, open areas with fewer overstory trees. In addition, he suggest that fire suppression may prevent the maintenance of open sites that support *O. pinorum* populations. Although, there is no direct evidence that *O. pinorum* tolerates fire, its host is well adapted to disturbance and responds by quickly resprouting (Harrod, et al. 1997). Given that this species is annual, it is assumed that even if fire did eliminate a reproductive stem, the local seed pool would compensate for the loss given that the host plant survived.

Iliamna longisepala is listed as Sensitive in Washington state and is on the Region 6 Regional Forester's sensitive species list (Washington Heritage, 1997; USDA Forest Service , 1990) and is considered a Federal Species of Concern by the U.S. Fish and

Wildlife Service. There are over 50 known occurrences of *I. longisepala* in the Wenatchee Mountains. Current research on *I. longisepala* indicates that this species does well in areas that have been disturbed, particularly when fire is the agent of disturbance (Kuhlmann and Harrod, 1995). Research showed that *I. longisepala* populations on burned sites had a significantly greater percentage of vegetative individuals then non-burned populations, indicating this species responds to fire through generation of new individuals (Kuhlmann and Harrod, 1998). This suggests that fire may be important in the conservation of this endemic species (Kuhlmann and Harrod, 1998). However, physical disturbance to individual plants during the growing season may affect reproduction. Since this species appears to rely on its seed bank for re-establishment following fire, physical disturbances that may limit reproduction should be avoided.

The rare orchid, *Cypripedium fasciculatum*, is currently listed as threatened in Washington State and as a federal Species of Concern. There are 24 known occurrences in the Wenatchee Mountains (Knecht 1996). *Cypripedium fasciculatum* is listed federally as a Species of Concern by the USFWS and the 1993 report of the Forest Ecosystem Management Assessment Team (FEMAT) listed *C. fasciculatum* as the only vascular plant species to potentially have more than half of its habitat negatively impacted under Option 9 of the Northwest Forest Plan. The report indicates that 55 percent of *C. fasciculatum* habitat could be extirpated and an additional 37 percent may be restricted to refugia as a result of implementation of the President's Forest Plan (FEMAT 1993). A recent examination of *C. fasciculatum* revealed this species requires a 60% or greater canopy cover to maintain vigorous populations (Knecht 1996). In addition, it appears this species cannot tolerate fire that eliminates the duff layer; however, if the burn intensity is low and the duff layer remains intact, the plants would tolerate the fire (Knecht 1996). Anecdotal observations of *C. fasciculatum* populations in both the Wenatchee Mountains and the Rogue River Valley suggest that this species is sensitive to physical disturbance and should be protected from any activity that has the potential to disturb the soil surface (Knecht 1996).

Environmental Effects

Alternative 1

Current grazing routes do not bring sheep within the proximity of known locations for either *O. pinorum* or *I. longisepala*. However, sheep do currently graze near and through existing populations of *C. fasciculatum*. Surveys revealed that under current conditions, sheep are not only trampling plants but are also selectively browsing this species due to its high palatability. This high level of disturbance represents a serious threat to the viability of this species within the planning area.

The nearby Williams timber sale may decrease the amount of habitat available for *C. fasciculatum*.

This loss of habitat coupled with the current grazing management would limit the potential for *C. fasciculatum* to maintain viable populations within the areas including and adjacent to the planning area.

Alternatives 2, 3

Both of these two alternatives eliminate grazing from the population center for *C. fasciculatum*. This would eliminate the effects of trampling and browsing to plants that exist under current conditions. Both of these alternatives would protect existing populations of *C. fasciculatum* and provide for plenty of undisturbed potential habitat into which known populations could expand.

Since potential grazing routes do not bring sheep within the proximity of known locations for either *O. pinorum* or *I. longisepala*, there would not be any effect to these species.

Alternative 4

The exclusion of grazing within the planning area would eliminate any potential negative effects on any rare plant species. Current populations of plants would persist and *C. fasciculatum* could show increases in population size and vigor based on the lack of disturbance.

Issue #16 - Survey and Manage Vascular Plants, Bryophytes, Lichens and Fungi

Q. How would alternative implementation affect survey and manage vascular plants, lichens, bryophytes, and fungi?

Important Interactions

The following table displays the Category 2 and Protection Buffer Survey and Manage species which have potential habitat within the planning area. Species are categorized by the broad group within which they reside and acre totals are provided for potential habitat the entire planning area. The potential habitat descriptions are based on the information provide by the Region 6 species teams and is documented within the individual protocol documents for Survey and Manage species.

The Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl lists standards and guidelines for many late successional and old-growth related species (Survey and Manage Species). The ROD states that "management of known sites should receive the highest priority..." and that "activities implemented in 1995 and later must have provisions for these known sites" (ROD, C-4).

Each survey and manage species is assigned to one or more of the following categories in Table C-3 of the ROD:

- Manage known sites; management of known sites should receive highest priority.
- Survey prior to ground disturbing activity. Measures to survey for species and manage newly discovered sites will be phased in. These surveys must be completed prior to ground disturbing activities that will be implemented in FY 1999 or later.
- Extensive Surveys. Extensive surveys should be conducted for these species to find high priority sites for species management.
- General Regional Surveys. The objective here is to acquire additional information and to determine the necessary level of protection for each species.

Category 2 and Protection Buffer/ Survey and Manage Plant Species with Habitat in the Planning Area			
Species Name	Species	Potential Habitat	Acres of Potential Habitat
Moss	*Ulota megalaspora*	Epiphytic on conifers, hardwoods, particularly maples, alder, tanoak and numerous other shrubs. Prefers branch tips away from competition of other bryophytes. Can be in dry sites.	5,946
Liverwort	*Tritomaria exectiformis*	On peaty or humic soil or on rotting wood, often in wet meadows with slowly moving water. Low to moderate canopy and shady, cool and moist but tolerates heavy shading and drier sites. Often associated with SETR, CAREX, ALIN, PEGR, AND DOJE. Tough to find and ID.	101
Fungi	*Otidea onotica*	On exposed soil, duff or moss in moist ABAM or TSME zones under PSME or TSHE. Also possible in moist ABGR/TSHE	12,056
	Sarcosoma mexicana; S. latahense	On conifer duff in moist ABGR/TSHE, ABAM, and TSME zones; also in riparian in drier ABGR.	12,056

These acre totals represent all potential habitat within the entire 50,000 plus acre planning area. Areas that were actually surveyed for these species were areas where potential habitat intersected with any historic or potential new grazing routes. All other areas would not be impacted by activities associated with grazing. Surveys were conducted for all of the above organisms during the fall of 1998 and spring and summer of 1999. None of the species listed above were located during any of our field surveys.

Environmental Effects

Alternative 1

There is no potential habitat for any Category 2 or Protection Buffer Survey and Manage Vascular Plant species or Lichens within the project. There is potential habitat for both Category 2 or Protection Buffer Fungi and Bryophytes, however, due to the lack of any known populations of the species listed above, implementation of this alternative would have no impact known sites.

While there is limited potential for the occurrence of any Survey and Manage Category 2 or Protection Buffer species within the planning area, some may actually exist and are as yet unknown within the project area. Any undiscovered populations of the moss listed above would likely persist under this alternative due to the epiphytic and ephemeral nature of the species biology. The one potential moss *U. megalaspora* is

epiphytic, which means it occurs within the canopy or along the bark of trees, well out reach of grazing ungulates.

Both fungi species produce an ephemeral fruiting body which is not considered palatable to sheep. Any trampling of these fruiting bodies by the sheep would reduce the organism's ability to reproduce, but would not harm the underground fungal mycelium. Excessive grazing of the vegetation could alter the micro-site characteristics that this species requires which could have a negative impact on individual populations.

While potential habitat for the liverwort *T. exectiformis* does exist within the larger planning area, mitigations common to all alternatives would likely prohibit grazing from areas where this habitat exist.

There is potential for the Category 1,3 lichen *Bryoria tortuosa* within the planning area, however, given the aboreal nature of this species grazing would not impact any existing populations or their habitat.

Alternatives 2, 3

The effects of implementing either of these alternatives would be similar to those stated above, with the difference being that Alternatives 2 and 3 each reduce the potential number of acres that could be grazed.

Alternative 4

This alternative would eliminate grazing within the planning area and any species which may exist and are unknown in the project area would likely persist.

Issue #17 - Biodiversity/ Vegetation Management

Q. How would alternative implementation affect diversity of upland vegetation within the planning area?

Important Interactions

Biodiversity is an umbrella term for the combined concepts of species, community, and genetic diversity. Biodiversity is measured (in part) by the number of different items of interest (species, plant communities) combined with the relative abundance of each item. It is presumed that natural areas unaltered by human activities had high levels of species and community diversity, with consequent underlying high genetic diversity. Historic conditions are often used as a baseline when evaluating the health (viability and vigor) of ecosystems, which has led to the social construct of high biodiversity as a desirable condition which indicates ecosystem health. Diversity of upland vegetation refers both to the diversity of plant communities present, as well as individual species diversity of non-riparian areas. Specific upland community types included as suitable for range use within the planning area are detailed in Chapter 1 under Issue 17-Biodiversity/Vegetation Management.

Plant communities evolved with grazing by native herbivores. Understory species such as bunchgrasses and rhizomatous grasses and sedges are adapted to and often stimulated by grazing. Many native shrubs such as vine maple (*Acer circinatum*) and oceanspray (*Holodiscus discolor*) can generate new shoots when grazed by resprouting. Grazing by bands of domestic sheep have a different pattern of use than

that of native herbivores. Livestock tend to graze some plant species more heavily than others. With overgrazing, three changes in plant density and composition take place: (1) preferred species decrease (these are called decreasers); (2) less palatable species increase (these are called palatable increasers) until continued heavy use causes them to decrease; and (3) unpalatable species increase (these are called unpalatable increasers). With serious depletion of the plant community, "invaders" colonize the site (Hall 1998). Sheep prefer forbs and grasses early in the season, and utilize shrubs to a greater extent late in the season. They prefer gentle slopes, and often avoid densely forested stands and thick brush. The sheep are herded in large groups, as opposed to native animals which travel in small groups.

Utilization of, and alteration to, native plant communities by sheep grazing depends on the time of year, duration of use, and plant composition. Intense grazing can decrease biodiversity as the sheep reduce the abundance of palatable species, reduce plant cover through trampling and consumption, and disperse weed seed. Over time this combination of effects leads to an increase in number and abundance of weedy species with a decrease in number and abundance of native species. At the extreme, plant species can be eliminated, and plant communities altered to the point at which they form a new complex unlike the historic composition. Conversely, moderate to light utilization of upland vegetation by sheep have smaller impacts on biodiversity.

Environmental Effects

Alternative 1

Forage utilization would remain at current levels under this alternative. While these levels are within acceptable use limits given overall allotment forage levels, all areas of the allotment are not utilized equally. Site-specific surveys showed varied levels of utilization by the sheep along current routes, with different levels of impact to species and community diversity.

Areas which have been lightly or moderately grazed had minimal impacts on diversity, the species composition and abundance appeared fairly natural, with low levels of weed species and bare ground exposed. There did appear to be lower amounts of certain monocot species (such as orchids) than would be expected given the community type. Under the current grazing guidelines, biodiversity of some upland sites, especially, but not limited to, bedding areas and load/unload sites, has decreased. In these areas there is a considerable percentage of bare ground, large patches of weedy native and nonnative plant species, absence of some expected native species, and changes in shrub growth form (lower leaves and branches missing). In a few bedding sites it seems that a "grazing climax" has formed, the plant community is greatly altered from the natural condition. The changes seen are probably due to either intense use by the sheep or from their passage through an area at a sensitive time.

A long-term effect of implementing Alternative 1 would be the continued decline in biodiversity of some sites, while diversity would remain high in others. Continued use of the areas currently receiving high use could result in long-lasting changes in biodiversity with an increased number of sites occupied by "grazing climax" communities. More subtle changes may be occurring over time on sites receiving low or moderate use. The species composition may be altered slowly from species with a

lower grazing tolerance to species with a higher tolerance. Evidence that this may be occurring was shown from the reduced abundance of orchids and other monocots .

Cumulative Effects - Portions of the planning area have been logged in the past, and there is currently an active sale in the Williams area of the Eagle-Blagg allotment. Past harvest of trees has decreased the average tree size and changed the species mix of some sites. Roads built to carry the logs are vectors of weed dispersal, therefore they impact species diversity. Fire historically shaped the plant communities within the planning area, promoting certain understory plants and often resulting in open stands of widely spaced trees. Natural fires have been excluded from the planning area for much of this century, altering species diversity and community diversity. Certain species have increased under fire exclusion, such as grand fir, while others like ponderosa pine have decreased. Recreational use by ORV enthusiasts, hunters, hikers, and people with recreational vehicles is increasing within the planning area. Recreational use can have negative effects on biodiversity when the use is in sensitive areas or at a high level of impact. These activities plus unaltered grazing management would combine to accelerate site degradation, with decreases in species and community diversity.

Alternatives 2, 3

Alternatives 2 and 3 include mitigations such as rotation of sheep routes by year and protection of sensitive areas, which would reduce overall impacts on biodiversity as each area would be grazed less often. However, rotating routes could entail designating new pathways which currently are not utilized by sheep. Some impact on biodiversity would be seen by the introduction of sheep to currently ungrazed sites.

Sheep bedding areas would be either hardened or eliminated, which would not impact species diversity. Most current bedding areas support low species diversity due to current use levels. Routes would be altered to avoid some highly impacted areas and these areas would be rehabilitated. Over time the biodiversity of these sites may be improved. Some sites with high levels of weed infestations would be avoided when the weed species is fruiting to reduce seed dispersal by the sheep. This may improve biodiversity by slowing the spread of invasive nonnatives, although no matter what time of year the areas are used there would be potential for seed dispersal (as sheep may pick up seed from the previous year).

Alternative 2 closes a small portion of the Eagle-Blagg Allotment to grazing, while Alternative 3 closes the entire Eagle-Blagg allotment and portions of the Switchback and Mosquito Ridge allotments to grazing. Under Alternative 2, allotment forage utilization remains the same as in Alternative 1, except for a negligible decrease in the utilization of the Eagle-Blagg allotment. Under Alternative 3, utilization of the Eagle-Blagg allotment drops to zero as it would be closed to grazing. Allotment forage utilization of the Mosquito Ridge Allotment drops more than fifty percent, while the utilization of the Limekiln and Switchback Allotments increases slightly. Cessation of grazing would have a beneficial impact on the biodiversity of sites exposed to intense pressure in the past, while having little impact on the areas which were lightly grazed.

The long-term effects of the proposed actions would increase species biodiversity, and possibly community diversity. By slowing the spread of weeds, rehabilitating highly

impacted sites, and removing sheep from certain areas, the biodiversity of sites should stabilize and in some cases would be increased.

Portions of the planning area have been logged in the past, and there is also an active timber harvest in place. Activities associated with the nearby Williams timber sale would decrease the available habitat for clustered ladyslipper (Cypripedium fasciculatum). Excluding grazing from the population center found within the Eagle-Blagg allotment would improve species viability. Elimination of grazing from parts (Alternative 2) or all (Alternative 3) of the Eagle-Blagg allotment, coupled with implementation of the Wenatchee NF Noxious Weed EA would increase overall species diversity within the planning area.

Alternative 4

Allotment forage utilization would be zero, increasing somewhat the overall plant biomass within the allotments. Trampling of areas would cease, halting the decline in plant cover seen on high impact sites, which would have positive effects on biodiversity. Over time, grazing cessation would result in recovery of many sites from grazing impacts. Effects on biodiversity caused by weeds would be lessened as areas are treated and weed populations decrease. Areas with high percentages of bare ground and soil compaction would likely improve as plants colonize the bare ground and as the level of compaction decreases due to the absence of sheep impact. Preferred forage species would increase in abundance over time, as residual individuals reproduce or species are re-established from areas not impacted by grazing. Together these effects would increase biodiversity, restoring native communities closer to their historic composition and abundance.

Grazing would cease to affect biodiversity under this alternative, as the allotments would not be grazed. Impacts caused by past grazing would remain, although over time many of the sites would recover much of their natural character. Implementation of this alternative coupled with an integrated noxious weed control program and site revegetation would improve the overall biodiversity of the planning area.

Issue #18 - Noxious Weeds

Q. How would alternative implementation affect the introduction of new weed species and/or the spread of existing weeds in the planning area?

The Table in Chapter 1, Issue 18, lists all weed species known to occur within the planning area and their current legal designation in Chelan County. Mitigation's outlined in Chapter 2 of this document describe the prevention and control techniques that would be implemented in conjunction with any proposed action.

Important Interactions

Noxious weeds are aggressive, non-native plants which can competitively exclude native vegetation, provide little to no forage value to wildlife, and can adversely impact the biodiversity of an ecosystem.

The term noxious is legal designation and applies to certain species deemed important by the state and county for control. However there are many other invasive weeds

which impact the quantity and quality of native plant communities. These species also need to be considered when evaluating the overall impact of weeds.

Weedy species are often colonizers, which means their establishment is favored in areas in which the native species matrix has been significantly disturbed. Once established, many weeds can persist and increase in number, displacing native species or eliminating them altogether. Biodiversity is therefore adversely affected as the number of species present decreases or the species mixture changes from native to nonnative with consequent loss of native species from the area. Weed establishment requires an available source of weed propagules and suitable habitat. Types of propagules include seed and vegetative structures such as rhizomes. Some species rely on seed, such as diffuse knapweed, while others such as dalmatian toadflax utilize both seeds and rhizomes.

Weed infestations within the planning area are larger where the disturbance is multi-faceted, i.e. in areas impacted by more than one type of disturbance such as off-road vehicles combined with grazing.

Weeds are closely associated with roads which provide pathways along which existing weeds disperse into an area, and are often sites at which new weeds are introduced. Main agents of weed introduction include machinery, vehicles, seed mixes, wind, or animals. Rate of dispersal after introduction varies, with some species (e.g. dalmation toadflax) invading long distances away from a road much more quickly than other species (e.g. diffuse knapweed).

Diffuse knapweed is known to offer some forage value to sheep during its vegetative rosette stage in April and May. Once the knapweed sends up a flowering stalk and blooms in June and July, sheep become dispersal agents with the seeds adhering to their woolly coats from July through September . Dispersal of knapweed by sheep is a major factor in those areas where the sheep cross areas with existing infestations.

Environmental Effects

Alternative 1

Current weed populations within the grazing allotments are concentrated along roads, in sheep bedding areas, and in load/unload sites. Direct grazing effects include consumption of palatable species by the sheep, dispersal of weed seeds, and increased bare ground exposed due to effects of sheep movement (trampling). The ground disturbance coupled with dispersal of weed seeds promotes weed establishment. Consumption of palatable species may decrease their abundance or stimulate their spread, depending on individual species tolerance to grazing. An indirect result of sheep preferentially grazing on certain species is the increase in abundance of species not consumed. Many of these species are weeds.

Under this alternative, new weed species could be introduced and existing weed populations would continue to spread. Long-term effects include expanded weed infestations, reduction of species diversity on infested sites and reduction in vegetative forage value for both domestic and native herbivores.

Past management actions have exacerbated the situation in some cases by promoting weed introduction, dispersal, and establishment. Previous activities such as logging and road building have created suitable habitat for weed establishment within the planning area. Loading and unloading areas would continue to be infested with noxious weeds.

Recreational use by ORV enthusiasts, hunters, hikers and people with recreational vehicles is increasing within the planning area. Recreational use can promote weed spread through carrying weed propagules, and by providing potential habitat through ground disturbance. Grazing would continue to contribute to weed spread and the increase in weed abundance along with these other factors due to the effects detailed above. A forest-wide noxious weed control plan is being developed which, if adopted, would allow managers to begin elimination and control of these invaders.

Alternatives 2, 3

Under Alternatives 2 and 3, sheep routes through the allotments would be rotated, resulting in smaller levels of ground disturbance as areas are not grazed every year. The reduction in this type of disturbance would slow weed establishment. However some new routes may be created to accomplish rotation strategy, opening up new areas to weed dispersal and establishment by domestic sheep. Spread of weeds within the planning area would likely be reduced following implementation of either of these alternatives, due to the fact that a smaller area would actually be grazed. Introduction of new weed species would not be greatly affected by the proposed measures.

Recreational use by ORV enthusiasts, hunters, hikers and people with recreational vehicles is increasing within the planning area. Recreational use can promote weed spread through carrying weed propagules, and by providing potential habitat through ground disturbance. The level to which grazing contributes to weed dispersal and establishment within the planning area may decline under these alternatives due to the effects detailed above. A forest-wide noxious weed control plan is being developed, which if adopted may allow managers to effectively combat these insidious invaders.

Alternative 4

Without sheep grazing, spread of weeds would slow as sheep are effective dispersal agents, however; the established populations would remain. Current weed populations within the grazing allotments are concentrated along roads, in sheep bedding areas, and load/unload sites. Direct grazing effects would cease under this alternative, as no sheep grazing would occur. Long-term effects of the implementation of this alternative on weeds would likely be a reduction in the rate of spread and introduction of new weed species within the planning area.

Past management actions have exacerbated the situation in some cases by promoting weed introduction, dispersal, and establishment. Roads and trails can act as pathways on which weeds migrate into an area, and past management goals have resulted in the construction of roads and trails within the planning area. Activities such as logging and grazing disturb the native species matrix, often creating suitable habitat for weed establishment. The planning area was heavily grazed for many years, and timber harvest has occurred in portions of the area.

Issue #19 - Economic

Q. How would alternative implementation affect economics of grazing in the planning area?

Environmental Effects

Alternative	Grazing Fees $	Direct Gross Value $	Total Economic Return* $
Alternative 1	2,310	199.1 460,000	1,380,000
Alternative 2	2,260	203 5 460,000	1,380,000
Alternative 3	790	189.87 150,000	450,000
Alternative 4	0	0	0

*Total economic return assumes a 3-point multiplier effect to identify total economic value, direct & indirect.

Alternative 1 and 2 would have a positive economic effect on the grazing permittee and the local economy.

Alternative 3 would have a negative effect on the grazing permittee and a reduction of value to the local livestock economy. The reduction in generated grazing fees would also result in a 15 percent reduction in Federal Range Betterment funding that is set up to help maintain federal range improvements.

Alternative 4 would terminate three sheep bands, for a total of 3,100 ewes. Animal months of grazing would decline from 8,554 animal months to zero. This alternative would have a negative economic affect on the grazing permittee and a reduction of the value to the local livestock economy. Approximately $2,310 worth of direct grazing fees would be lost and would also result in approximately 20 percent reduction in Federal Range Betterment funding ($1,000/year). There would be no gross values generated from grazing National Forest System lands. The total direct and indirect opportunity losses would be $1,395,000.

Issue #20 - Tree Growth and Structure

Q. What effects will future grazing have on tree growth and structure?

Environmental Effects

Alternatives 1, 2, 3

The following effects discussion applies to all alternatives which include grazing. The differences in effects between alternatives are directly related to the acres grazed.

Continued grazing should have little to no effect on stand density in most stands that are already fully stocked or overstocked with trees. (These types of stands dominate most areas). The change from low density to high density structure has already occurred in these stands and the shaded, highly competitive environment is not conducive to seedling growth.

Grazing in low to moderate density stands that are not fully stocked or overstocked with trees (recent clear-cut or partial cutting areas) could encourage seedling establishment and could improve tree growth of all residual trees (Halloin, 1991). Increased tree

stocking would be beneficial in areas considered understocked but undesirable in areas already considered adequately stocked. Improved tree growth, indicating improved vigor would be desirable.

Confined grazing may not contribute to long term dry forest restoration plans. Known as the Wenatchee National forest "dry site strategy" the long term effectiveness on restoration thinning designed to reduce stand density, would be reduced by any agent which encourages development of a dense understory tree layer.

Bedding Areas - Trampling and browsing damage has been observed in one plantation indicating the potential for bedding areas to discourage seeding or small sapling establishment.

Alternative 4

The effects of a no grazing alternative would be the same as the grazing alternatives in high to moderate density stands that are already fully stocked or overstocked with trees.

In low to moderate density stands that are not fully stocked or overstocked with trees, seedling establishment and growth would not change if livestock are well distributed and grazing does not occur on wet soil surfaces (Halloin, 1991). Tree growth of residual trees may not be as great as in grazed sites because more site resources would be consumed by ungrazed ground vegetation. Tree establishment would not be affected by grazing in future restoration thinning stands.

Issue #21 - Recreation Use

Environmental Effects

Alternative 1

This alternative would continue grazing at the current level. The planning area does not include any developed recreation sites or developed trails. However the area is used by people recreating on the forest.

There are numerous undeveloped campsites throughout the area. People who want to camp in areas with few developments away from crowds often use areas such as this. With a few exceptions the sites are not used regularly. The notable exception is the open area about a mile up the East Van Creek road. This area seems to be a popular group camping area with regular use. For other areas, use is periodic and probably heaviest during hunting season.

There are numerous old spur roads and sheep driveways throughout the area. These are sometimes used by mountain bikes, ORVs, and horses.

Sheep are currently trailed along roads and driveways. They pass through many of the undeveloped recreation sites. Areas used as herder camps and bed grounds are used as dispersed campsites by the public. When sheep are bedded in an area, the site is unavailable for camping use by the public. This does not exceed two days for any given site. A herder could be camped at a specific site for a longer period of time (up to ten days). During this time it would not be available for use by other public. At all other times sites would be available.

Although sites would be available for use when sheep are not present, it may not be desirable. Areas that sheep have passed through or bedded down in have a distinct odor. In most cases, these areas would probably not be used for camping for up to three weeks after sheep have passed. This usually affects sites that are likely to be used by the public from about mid-July through August mostly along the lower East Van Creek Road.

Transient use by horses (including the Eagle Creek Outfitter/Guide's operations), mountain bikes, ORVs, walkers, people driving roads for various purposes would not be curtailed although it might be temporarily delayed as sheep usually block passage for a short time.

Alternative 2

This alternative would allow grazing as per *Wenatchee National Forest Land and Resource Management Plan* Standards and Guidelines. The planning area does not include any developed recreation sites or developed trails. However the area is used by people recreating on the forest.

Some sheep bed grounds and herder campsites would be closed for grazing purposes. These sites would then be available for public use for the entire season. On other sites that are used, use would be restricted or undesirable as per Alternative 1. The sites that would be restricted to sheep use are in the Derby-Blagg area. Dispersed camping sites in this area receive very limited public use except perhaps during hunting season. The overall affects of this alternative would be almost identical to Alternative 1 as far as the effects to the public are concerned.

Transient use by horses (including the Eagle Creek Outfitter/Guide's operations), mountain bikes, ORVs, walkers, people driving roads for various purposes would not be curtailed although it might be temporarily delayed as sheep usually block passage for a short time.

Alternative 3

This alternative would eliminate the Eagle-Blagg allotment and about 1/2 of the Mosquito Ridge allotment from grazing use. This would eliminate domestic sheep from dispersed sites in these areas. These sites receive infrequent use. The heaviest use occurs during hunting season. The recreating public would be mostly unaware of these changes as the dispersed sites are used infrequently during periods when they would be affected by grazing. The heavier used dispersed sites in Van Creek would still be used by sheep and the public would experience some displacement and inconvenience during grazing periods as per Alternative 1.

Transient use by horses, mountain bikes, ORVs, walkers, people driving roads for various purposes would not be curtailed or delayed by sheep in these areas of Eagle-Blagg or Mosquito Ridge. Delays would still be experienced in other areas of the allotments. The Eagle Creek Outfitter/Guide's operation would not be affected by sheep grazing as the guiding activities occur in the restricted portion of the Eagle-Blagg Allotment.

Alternative 4

This alternative would eliminate all grazing from present allotment areas. This would probably result in some increased recreation use at dispersed sites in July and August. The major increase would probably occur in the Van Creek area.

There would be no delays or inconveniences to the public traveling on roads or undeveloped trails caused by grazing. No increase of this kind of use is anticipated as a result of the elimination of grazing. Old driveways and spur roads currently used by sheep will experience increased encroachment by vegetation. Some of the routes that receive light public use may become closed by such encroachment. The Eagle Creek Outfitter/Guide's operation would not be affected by sheep grazing.

Issue #22 - Public Safety

Important Interactions

The sheep are trailed on roads and old driveways between pasture units and bed grounds. Many of the roads and driveways are used by the public for driving, horseback riding, mountain biking, and for riding motorcycles. The sheep themselves move relatively slowly and will not directly harm people. However, they are usually bunched together and form a complete blockage of the road or trail. They are normally only a source of inconvenience and short-term delay rather than a hazard. The situation is only hazardous if someone is traveling too fast for conditions.

Environmental Effects

Alternative 1

This alternative would not change current routing or grazing practices. There have been no reported safety problems between sheep and general public. A commercial outfitter offering day horseback rides out of Eagle Creek Ranch has reported conflicts between his clients and sheep. The outfitter uses some of the old closed roads above the ranch under permit from the Forest Service. The sheep also use these roads as driveways when they are on that portion of the allotment and have done so for many years. The outfitters horses apparently do not behave well around the sheep and cause problems for the inexperienced riders on the outfitters horses. The outfitter needs to alter his procedures when sheep are in the area.

Alternative 2

This alternative would be similar to Alternative 1 except there would be slightly less exposure to the general public. There would be no change to the commercial outfitter.

Alternative 3

There would be less exposure to the general public as the Eagle-Blagg allotment would not be used. There would be no change to the commercial outfitter.

Alternative 4

There would be no sheep in the area and thus grazing would not be a safety concern for anyone.

Issue #23 - Private Land

Environmental Effects

Alternative 1

When the sheep graze an area they have the potential to stray on to private land. They normally do not go on land with higher density single family residences. They normally cross, recross, and graze larger blocks of private land as they pass through. The County has classified this area as open range which means if landowners want livestock excluded from their property, they must fence them out. Some land owners have talked with the sheep owner about staying off their land. Others such as Longview Fibre have allowed use on their land.

This issue will become a bigger problem in the future as more building occurs on private lands adjacent to the National Forest. Most of the canyon bottoms are being developed with private homes. New owners in most cases are not as tolerant as in the past. Herders usually try to keep sheep off of sensitive private property. Problems between private land owners and the sheep owner are normally settled privately.

Most conflicts occur with residents in the Eagle Creek and the east tributary canyons of the Chumstick such as Merry Canyon. Longview Fibre is the largest landowner in the area and on occasion has had some problems in newly replanted timber harvest units.

Alternative 2

Conflicts and effects to landowners would be about the same as Alternative 1. Most of the routing and grazing restrictions would be on the Eagle-Blagg allotment which has historically had few private landowner issues. The main areas of conflict are in Eagle Creek and Chumstick tributary canyons.

Alternative 3

Same as Alternative 2.

Alternative 4

There would be no effect to private landowners from domestic sheep grazing.

Issue #24 - Heritage Resources

Important Interactions

The National Historic Preservation Act (NHPA) of 1966 established the federal government's policy and programs on historic preservation. Section 106 of the Act requires Federal agencies having direct or indirect jurisdiction over a proposed Federal or federally assisted or permitted undertaking, to take into account the effect an undertaking may have on historic properties listed on or eligible for the National Register of Historic Places and it affords the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on such undertakings (16 U.S.C. 470f). The Washington State Office of Archaeology and Historic Preservation (OAHP) and the ACHP are the state and federal agencies respectively, responsible for overseeing the management and protection of historic properties in compliance with the NHPA.

Archeological Survey - Analysis methods relied entirely on existing information. Previous cultural resource surveys and site information was overlaid on allotment maps to determine any additional survey needs and if known sites were located in places likely to be disturbed by continued grazing uses. Also, the probability for having undiscovered sites in bedding and watering areas were estimated from intuitively derived expectations about site distributions in similar areas. Based on this analysis, we determined that no new survey was needed to conduct effect assessment.

Tribal and Traditional Cultural Properties- The grazing allotments are within the geographic area that once was the traditional home territory of the Wenatchee and Entiat Indians. Descendants of these groups are now affiliated with both the Confederated Bands and Tribes of the Yakama Indian Nation and the Confederated Tribes of the Colville Reservation. The area is also part of the ceded land of the Yakama Indian Nation under the terms of the Treaty with the Yakama of 1855.

The Confederated Tribes and Bands of the Yakama Indian Nation and the Confederated Tribes of the Colville Reservation were informed of this project by letter dated May 5, 1998. To this date, no concerns over this analysis have been received. If any issues arise, an evaluation would be done on of the potential effects that grazing may have on these properties, and appropriate mitigation measures relative to the permit would be developed.

Historic Grazing -Use has been documented on the areas included in these allotments since the late 1800's. The grazing use included cattle, horses and large numbers of sheep, and was essentially uncontrolled. Early Forest Service records for the 1920's while incomplete, indicate that 11,000 ewes with lambs used the area. This number is based on reports of ten allotments whose boundaries were at least partially within one of the four allotments of the current planning area (USDA Forest Service WNF 1920's). Allotment reports from the 195'0s indicate that the number of sheep using an area decreased, mainly through the mechanism of increasing the number of acres for each band (USDA Forest Service, Lake Wenatchee 199s). The current number of sheep on the allotments is significantly less than the historical numbers and the associated disturbances are correspondingly less.

Disturbance Potential- Sheep grazing activity has the potential to disturb heritage resource sites primarily through the trampling effect of hooves. The greatest potential for site damage relates to prehistoric sites with surface or near surface distribution of artifacts. The effect of many animals congregated in a small area, churn the soil and displace and break artifacts. The most potential for this damage occurs near watering and bedding grounds. Riparian areas have the highest potential for this type of damage, followed by other areas relatively of flat ground or ridge tops.

Environmental Effects

The following summarizes possible effects to sites that are awaiting concurrence on eligibility determinations. Three of the sites lie on the summit of Entiat Ridge in the Limekiln Allotment far above the road system (Faultline Road) used as a driveway route. The bands of sheep would not be near these sites. The Van Creek Sheep Camp is also out of any current grazing route since it lies in a riparian zone. This site has not been used by sheep for a number of years, but once served as a water development.

All proposed new developments or hardening projects would be surveyed prior to renewal of the permits. Any new heritage sites would be evaluated and protected through avoidance or other appropriate means if they are deemed to be eligible to the National Register of Historic Places.

Potential Effects to Heritage Sites				
F.S. Site #	Site Name	Eligi-bility	Type	Effect
061707/012	Van Creek Springs Sheep Camp	U	Sheep camp	None, in riparian zone, no longer part of allotment use area
061707/014	Medicine Springs	U	Sheep camp	None, ridge top, but not on Limekiln route any more
061706/054	Miner's Corral Ditch	U	Irrigation diversion	None, ridgetop, no grazing use nearby
061706/014	Sugarloaf Lookout	NR	National Register lookout	None, ridge top, no grazing use nearby

Alternatives 1, 2, 3

Grazing would not affect eligible or sites whose eligibility is not yet determined since current grazing activity is routed away from these areas. In general, effects of the current permit are much less than grazing activity in the past due to greatly reduced numbers, and changes in grazing routes and removing activity from springs and creeks.

Alternative 4 - Bighorn Sheep Management

Alternative 4 would eliminate any effects from grazing domestic sheep. There would be no disturbance of existing sites or impacts to any undiscovered heritage resources.

Specifically Required Disclosures

None of the alternatives would have any impact on women, minority groups, or the civil rights of any United States citizen. Native Americans having established historical uses for sacred or religious purposes would be consulted as described in the Wenatchee Forest Plan.

None of the Alternatives would have any impact on prime farmland, rangeland, floodplains, or wetlands.

The removal of grass and herbs by livestock grazing constitutes irretrievable effects.

There are no irreversible effects associated with any of the alternatives. There are no identified conflicts in any of the alternatives with the Wenatchee Forest Plan or the land use plans of any other Federal, State, or local agency.

Environmental justice is achieved when everyone, regardless of race, culture, or income enjoys the same degree of protection from environmental and health hazards and equal access to a healthy environment in which to live, work, and play. Minority or poor communities adjacent to the Lower Peshastin area include Hispanics and American Indians.

Many Hispanics living in the area hold lower paying jobs in the service and agricultural industries. The planning area is land ceded to the U.S. Government by the Yakama Indian Treaty of 1855 which defined rights and privileges on 'open and unclaimed' National Forest System lands. Many American Indians have a rural life-style that is reliant on a clean and healthy environment. The Forest also offers sites that have religious or spiritual meaning to some American Indian groups.

Scoping for this project was through public notices and letters to known interests. Contacts were specifically made to the Yakama Indian Nation and the Colville Confederated Tribes.

The effects that any of the action alternatives would have on these communities are indirect and low level. Few Hispanics are known to use this portion of the Forest. Employment would be created or lost through jobs in sheep herding. Neither the Colville Confederated Tribes nor the Yakama Indian Nation identified any specific areas of interest, apart from the large issues such as fisheries, which are addressed elsewhere in this document. Range that is not grazed would restore greater bio-diversity, more variety of plants. Sheep select for monocots, which include camas, a Native American food source. Range that is not grazed would provide more favorable food gathering opportunities.

Chapter 4
List of Preparers

The following individuals were responsible for the environmental analysis and documentation.

Name	Contribution
Robert Stoehr	Team Leader
Daniel Rife	Fisheries Biologist
Dorothy Knecht	Botanist
Ann Fink	Archeologist
Denny McMilliam	Recreation Planner
Bill Gaines	Wildlife Biologist
Matt Karrer	Hydrologist/Soil Scientist
Carl Davis	Range Specialist
Bill Hartl	Silviculturist
Sue Stewart	Fuels Planner
Maureen Hanson	Acting District Ranger
Ruth Anne Miller	Editor

Chapter 5
Persons, Organizations, and Agencies Providing Comments

Individuals	Organizations	Agencies
Liz Tanke	S. Martinez Livestock, Inc.	WA State Department of Wildlife
Erik Ryberg		
John Meadows		

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Appendix A
Maps

NORTHWEST FOREST PLAN LAND MANAGEMENT ALLOCATIONS

WENATCHEE NATIONAL FOREST PLAN LAND MANAGEMENT ALLOCATIONS

ALTERNATIVE 1

ALTERNATIVE 2

ALTERNATIVE 3

SHEEP DRIVEWAYS AND BEDDING AREAS

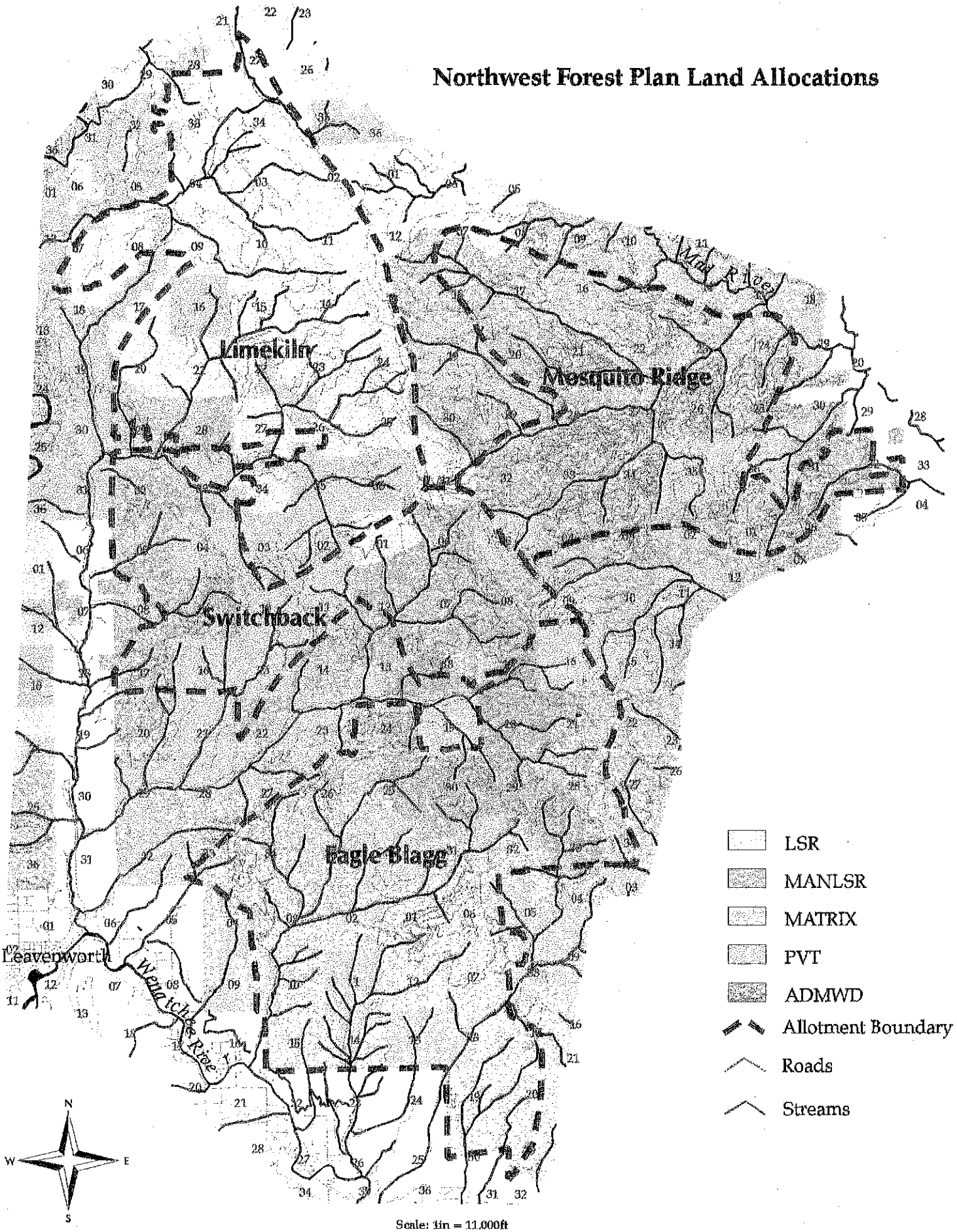
SUITABLE RANGE

PRIMARY RANGE

VEGETATION TYPE MAPS

SWAKANE BIGHORN SHEEP RANGE

Range Allotment Environmental Assessment



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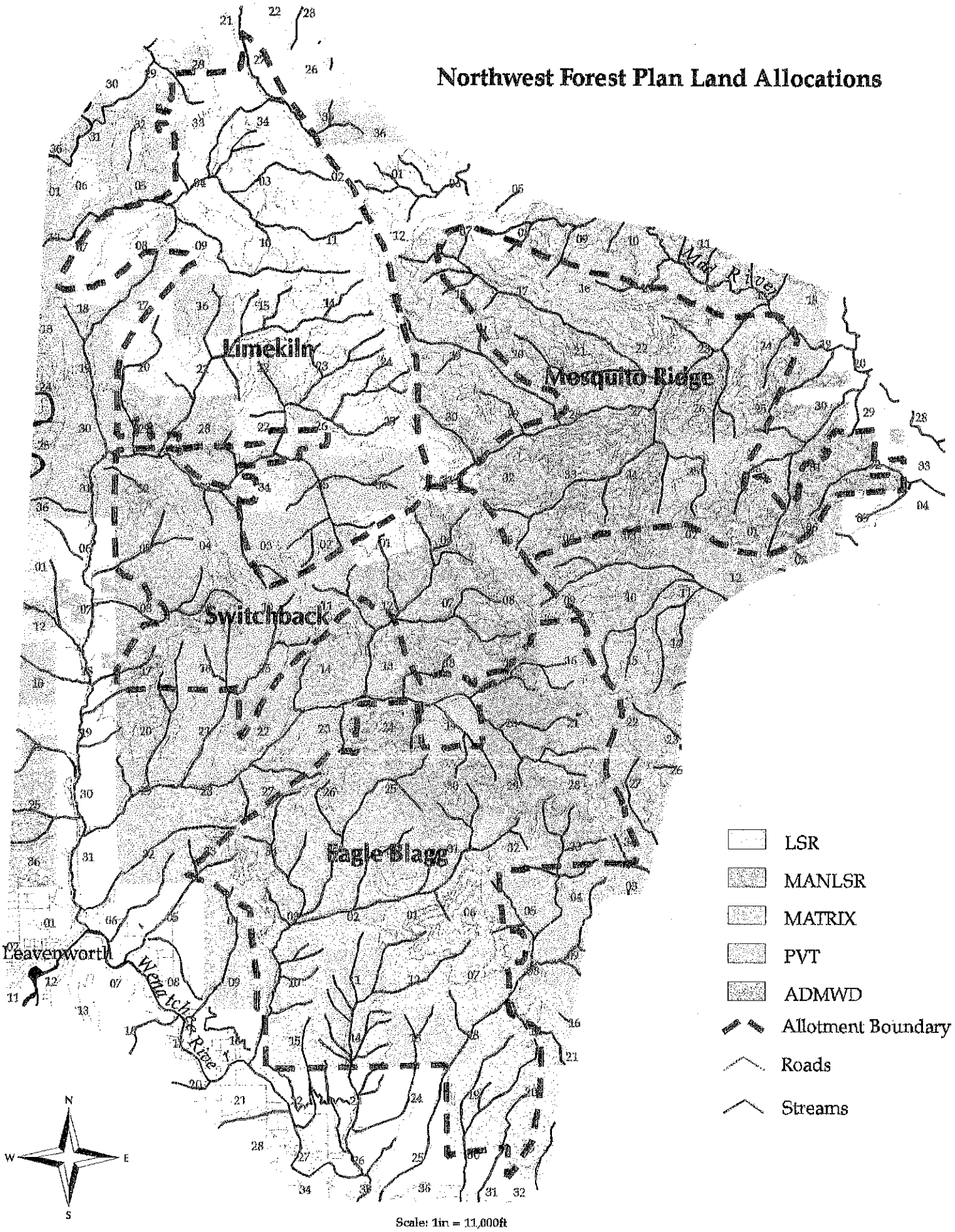

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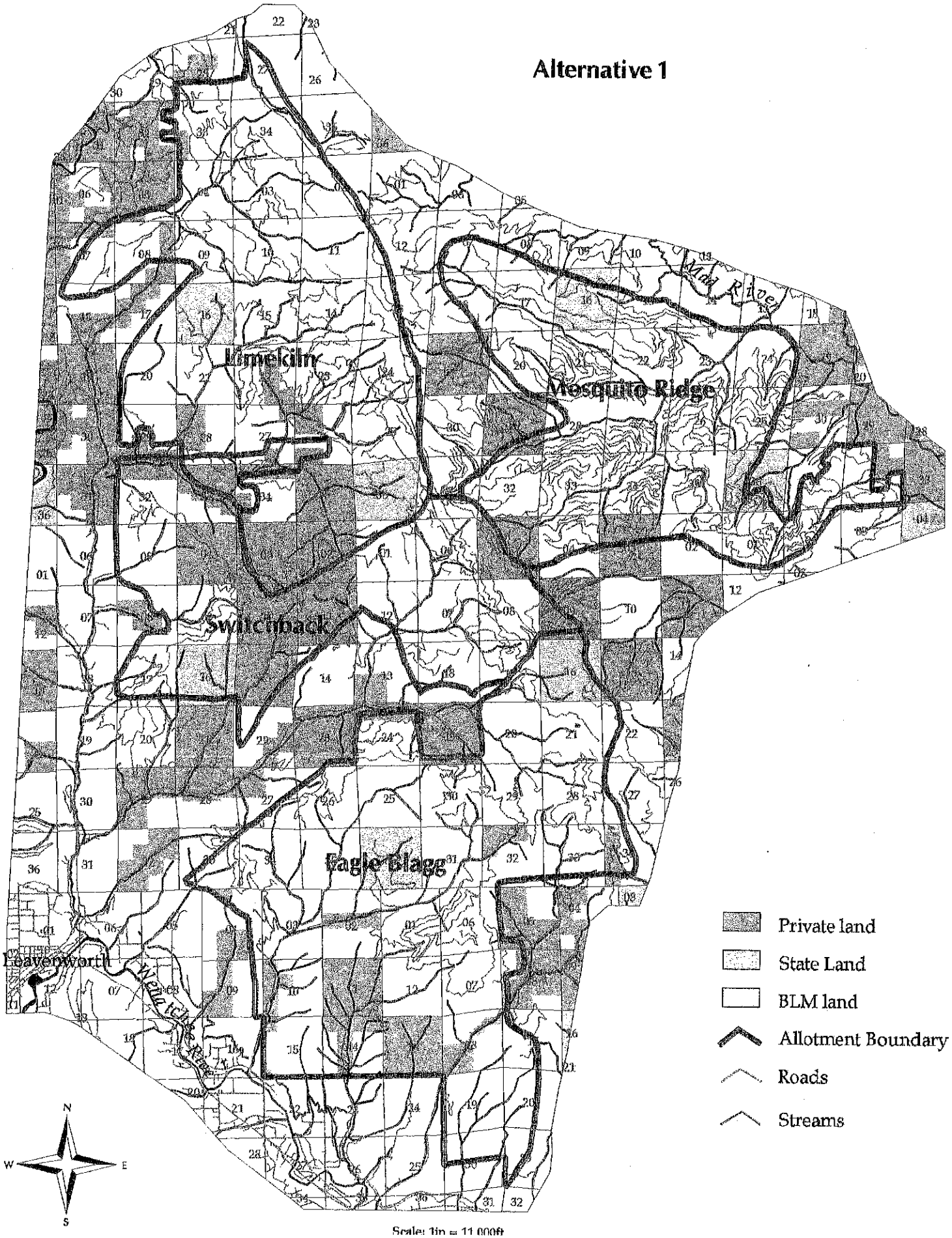

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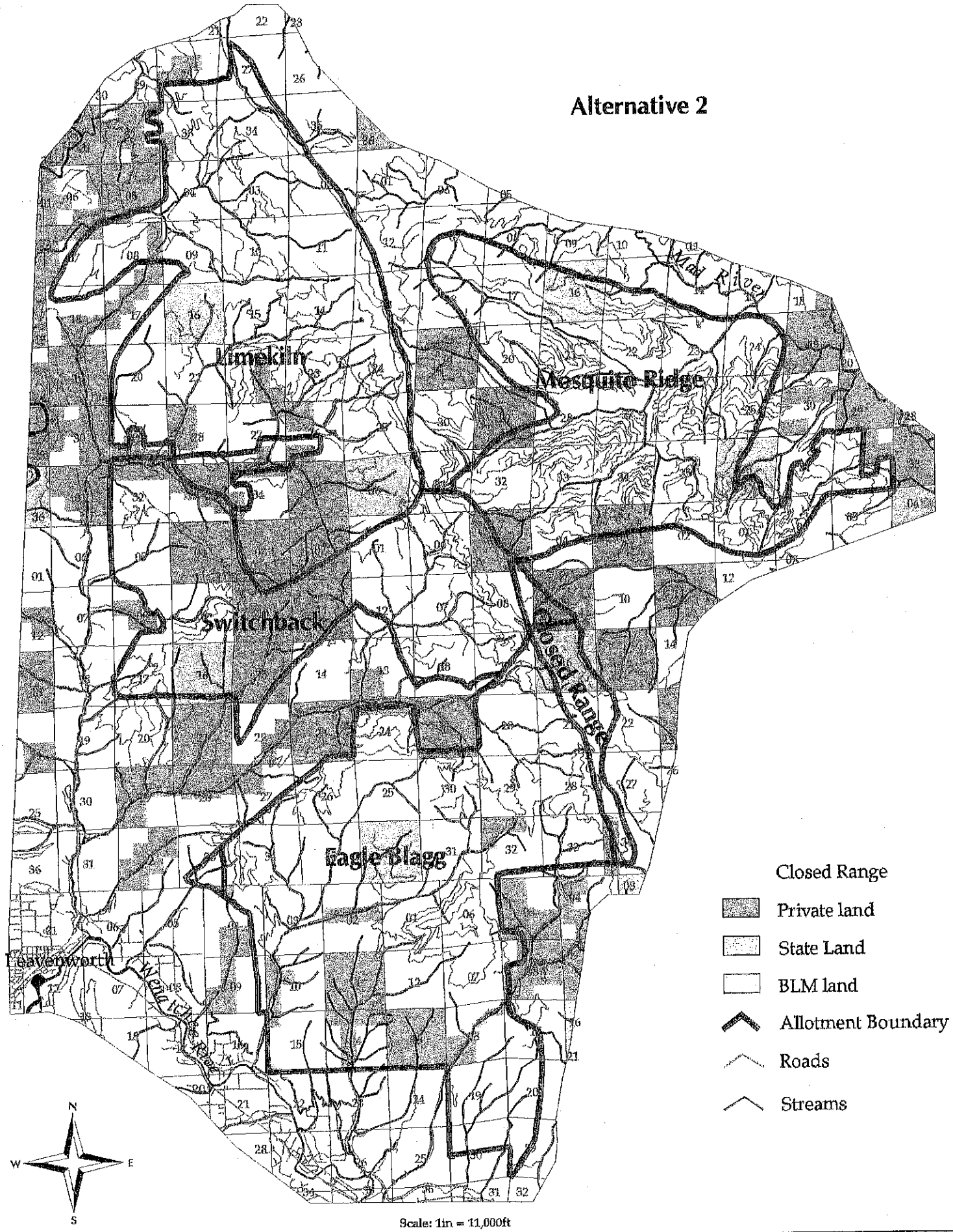
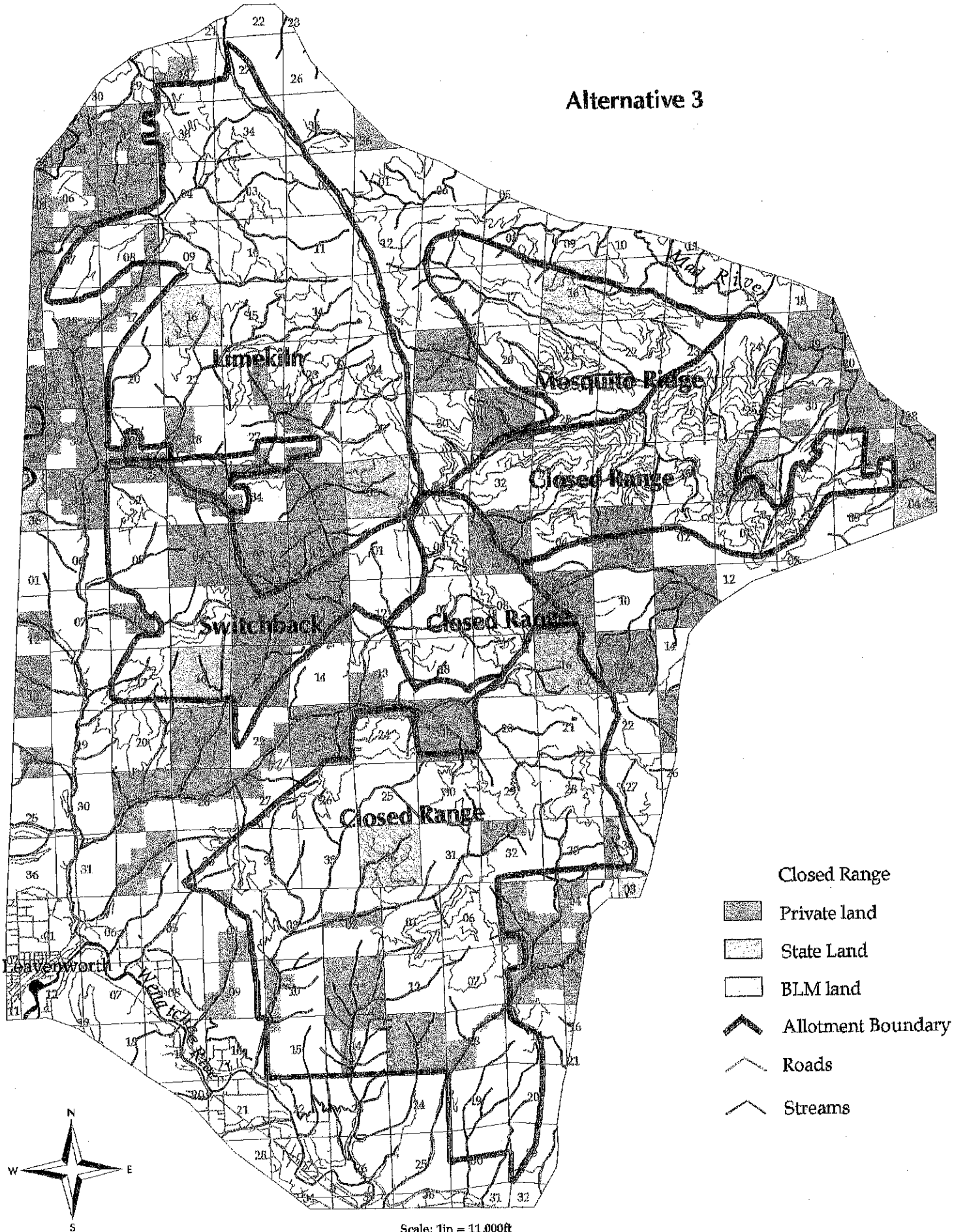
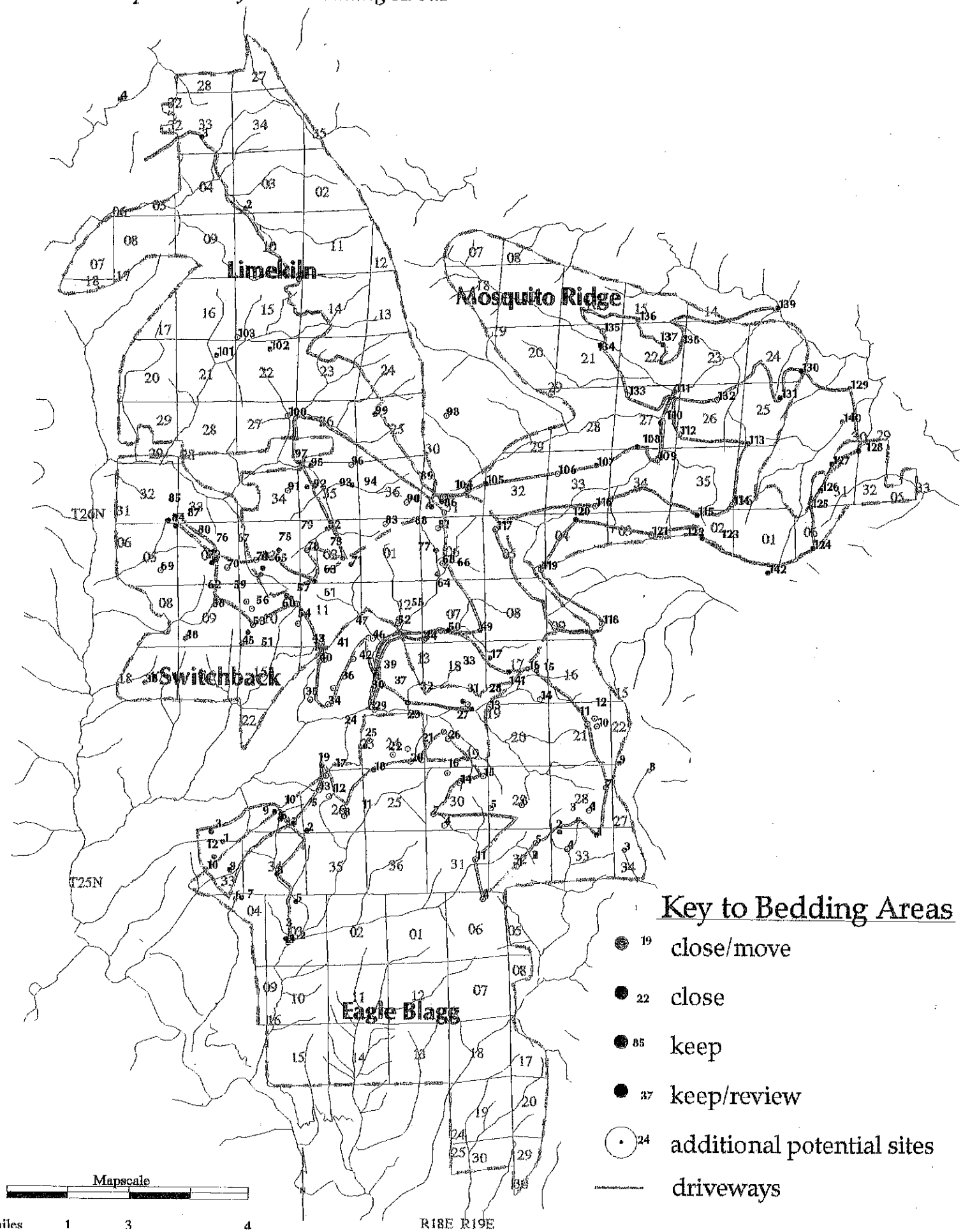


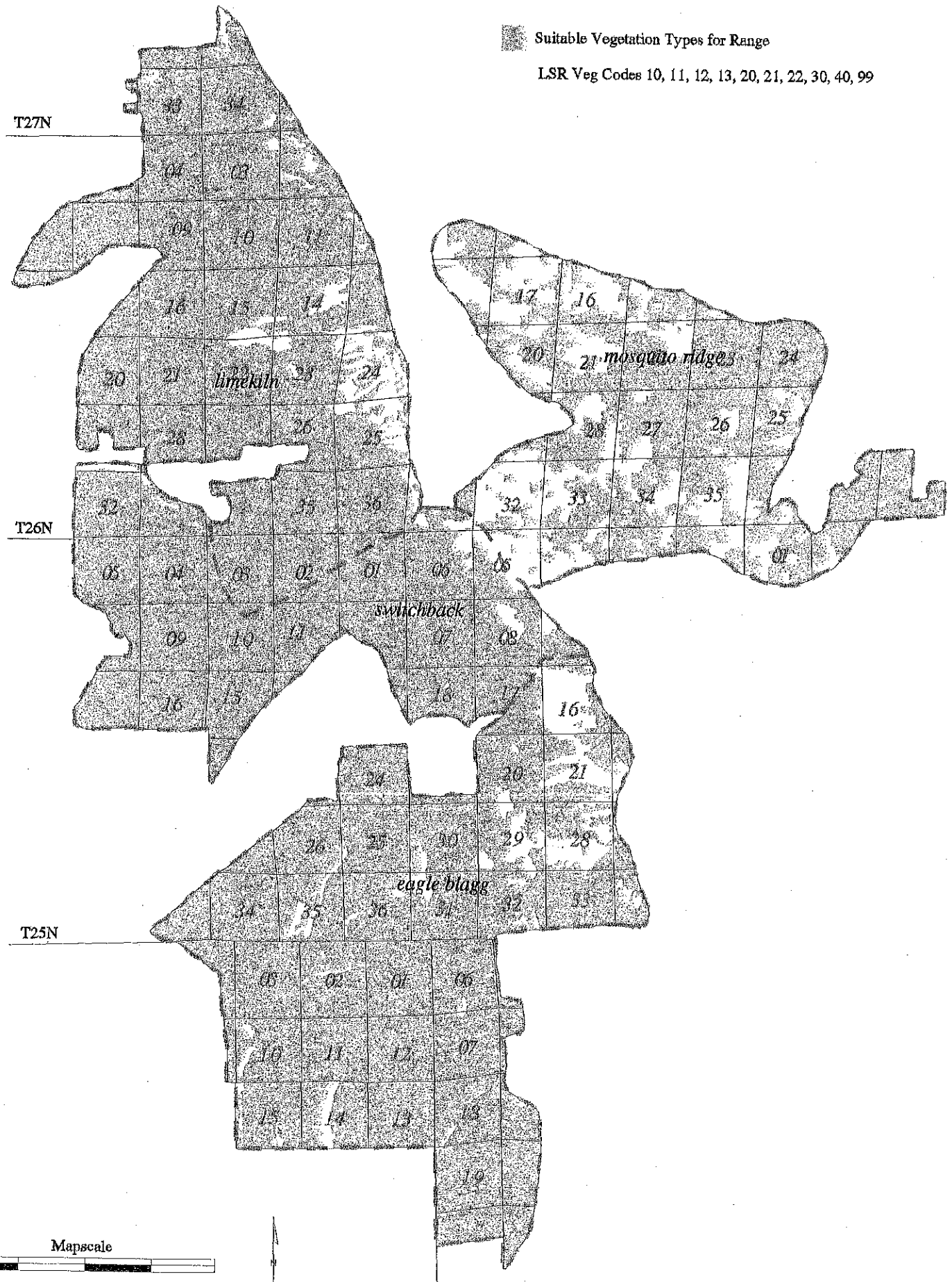
Range Allotment Environmental Assessment



Sheep Driveways and Bedding Areas



Suitable Range - Based on Vegetation Type'



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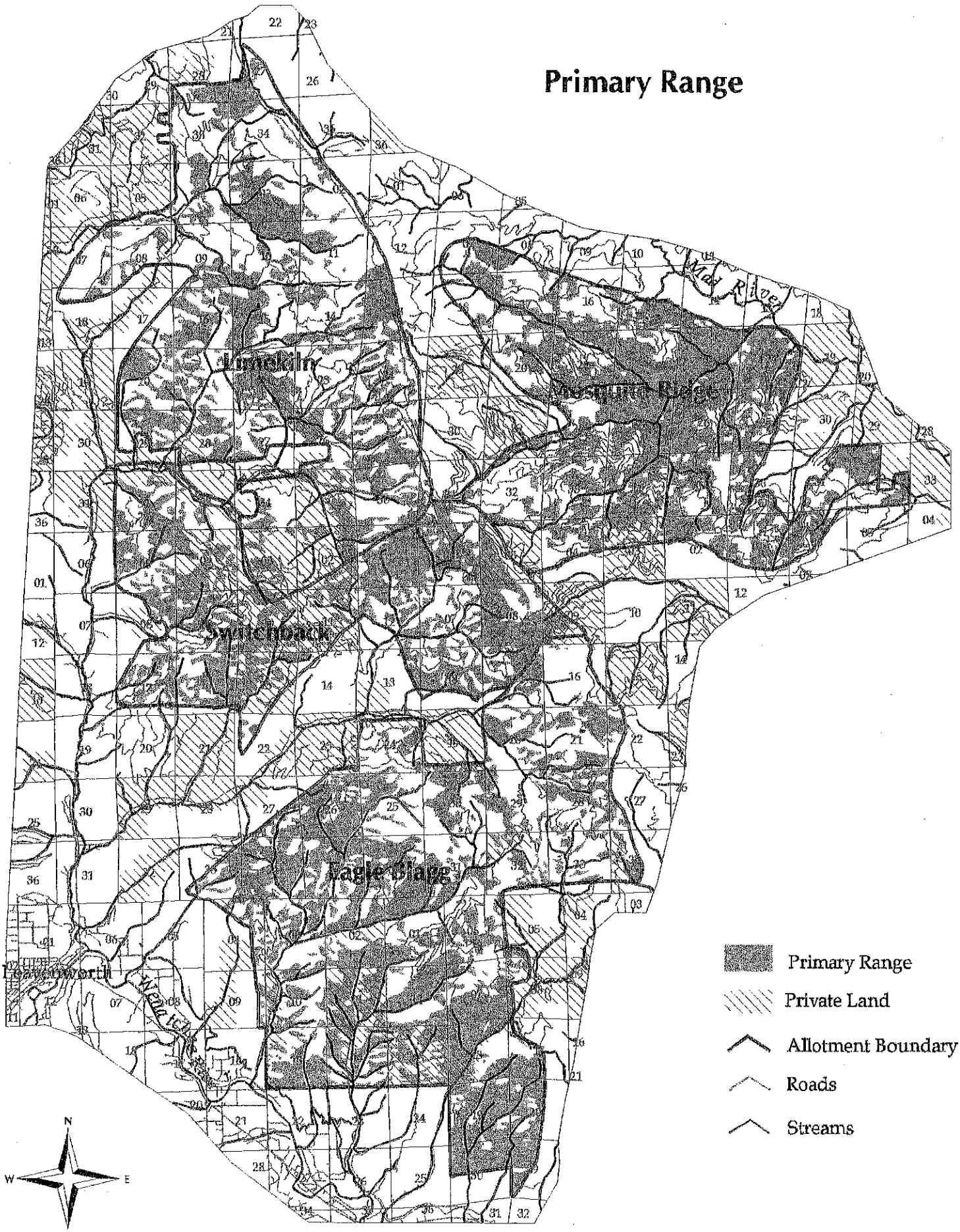

Scale: 1in = 11,000ft

Mosquito Ridge Allotment
Vegetation Types

- agricultural/pasture/residential (0)
- cliff (3)
- bedrock (4)
- scree (6)
- upland meadow (7)
- wet meadow (8)
- brushfield (9)
- dry forest, created opening (10)
- dry forest, low density (11)
- dry forest, successionally advanced (12)
- dry forest, partial cut (13)
- mesic doug fir, created opening (20)
- mesic doug fir, single layered (21)
- mesic series, layered/mature (22)
- moist grand fir, created opening (30)
- moist grand fir, single layered (31)
- moist grand fir, layered/mature (32)
- moist grand fir, partial cut (33)
- subalpine fir series, created opening (40)
- subalpine fir, single layered (41)
- subalpine fir, layered canopy (42)
- subalpine fir, parkland (43)
- subalpine fir, droughty sites (44)
- lodgepole series, created opening (50)
- lodgepole series, layered canopy (52)
- wet series, created opening (60)
- wet series, single layered (61)
- wet series, layered or mature (62)
- deciduous forest (98)
- non forest, grassland, shrubland (99)
- Entiat's Code (100)

- agricultural/pasture/residential (0)
- cliff (3)
- bedrock (4)
- scree (6)
- upland meadow (7)
- wet meadow (8)
- brushfield (9)
- dry forest, created opening (10)
- dry forest, low density (11)
- dry forest, successionally advanced (12)
- dry forest, partial cut (13)
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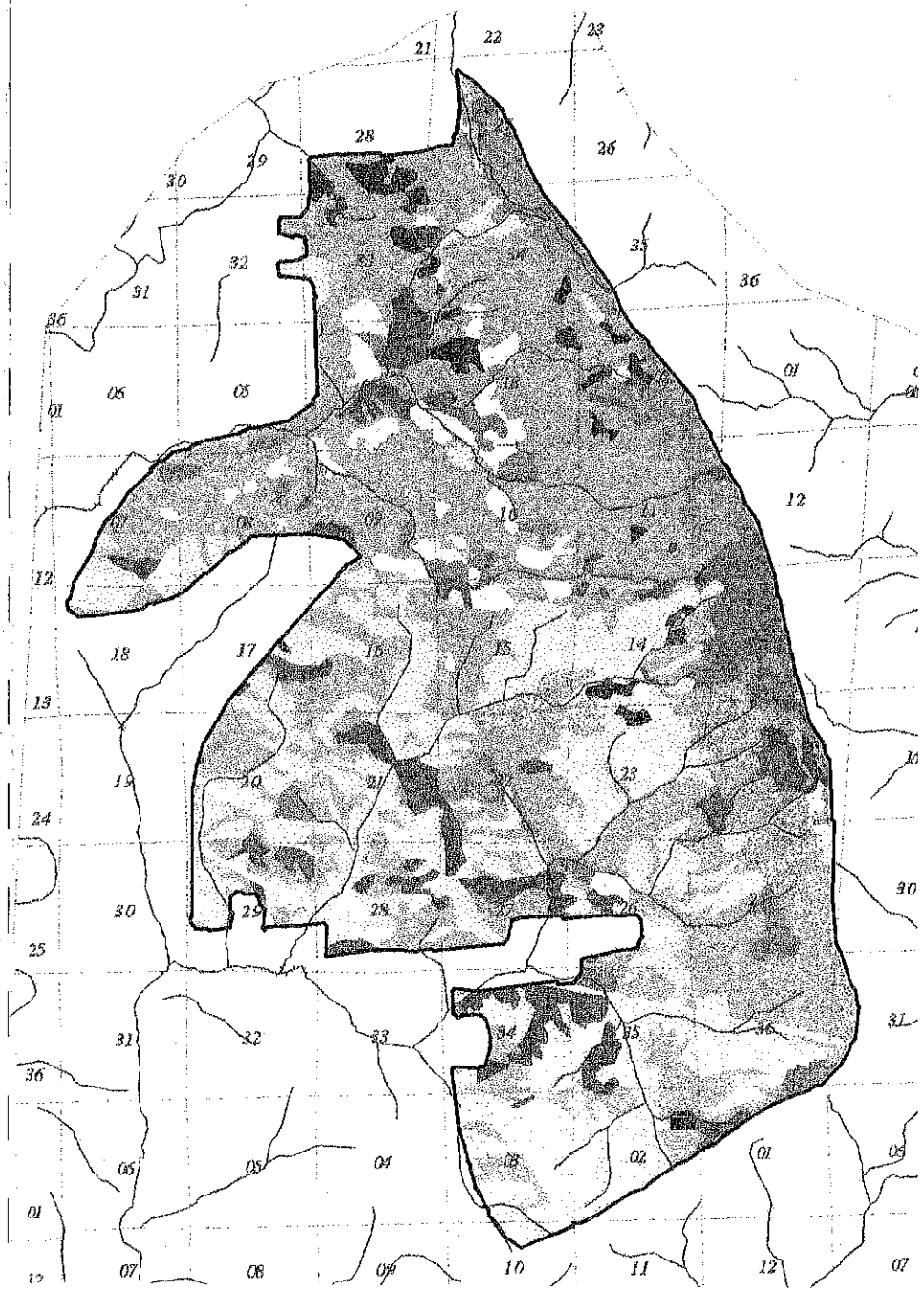
- mesic series, layered/mature (22)
- moist grand fir, created opening (30)
- moist grand fir, single layered (31)
- moist grand fir, layered/mature (32)
- moist grand fir, partial cut (33)
- subalpine fir series, created opening (40)
- subalpine fir, single layered (41)
- subalpine fir, layered canopy (42)
- subalpine fir, parkland (43)
- subalpine fir, droughty sites (44)
- lodgepole series, created opening (50)
- lodgepole series, layered canopy (52)
- wet series, created opening (60)
- wet series, single layered (61)
- wet series, layered or mature (62)
- deciduous forest (98)
- non forest, grassland, shrubland (99)
- Entiat's Code (100)



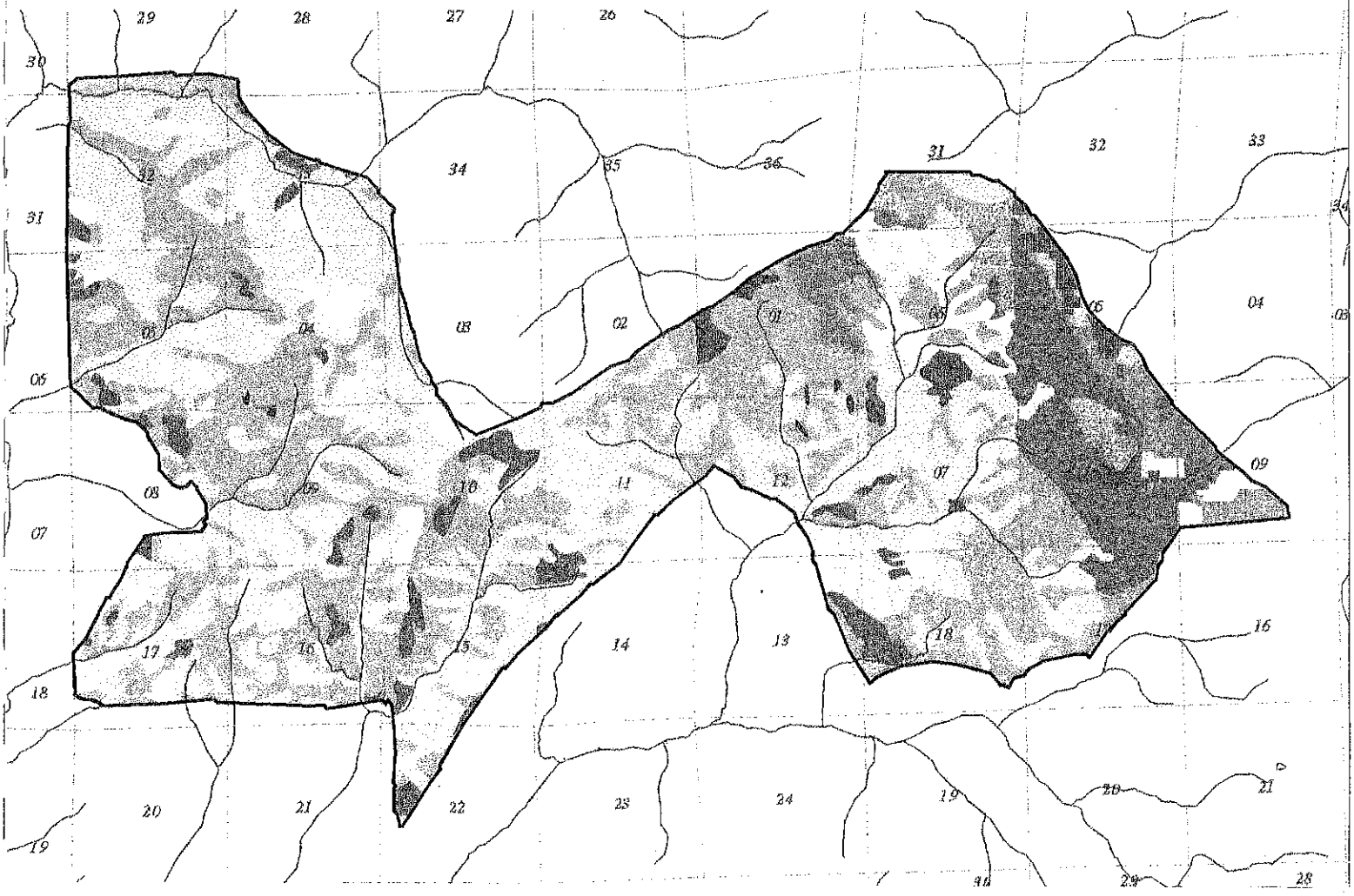
Limekiln Allotment

Vegetation Types

Switchback Allotment

Vegetation Types

- agricultural/pasture/residential (0)
- cliff (3)
- bedrock (4)
- scree (6)
- upland meadow (7)
- wet meadow (8)
- brushfield (9)
- dry forest, created opening (10)
- dry forest, low density (11)
- dry forest, successionally advanced (12)
- dry forest, partial cut (13)
- mesic doug fir, created opening (20)
- mesic doug fir, single layered (21)
- mesic series, layered/mature (22)
- moist grand fir, created opening (30)
- moist grand fir, single layered (31)
- moist grand fir, layered/mature (32)
- moist grand fir, partial cut (33)
- subalpine fir series, created opening (40)
- subalpine fir, single layered (41)
- subalpine fir, layered canopy (42)
- subalpine fir, parkland (43)
- subalpine fir, droughty sites (44)
- lodgepole series, created opening (50)
- lodgepole series, layered canopy (52)
- wet series, created opening (60)
- wet series, single layered (61)
- wet series, layered or mature (62)
- deciduous forest (98)
- non forest, grassland, shrubland (99)
- Entiat's Code (100)



- agricultural/pasture/residential (0)
- cliff (3)
- bedrock (4)
- scree (6)
- upland meadow (7)
- wet meadow (8)
- brushfield (9)
- dry forest, created opening (10)
- dry forest, low density (11)
- dry forest, successionally advanced (12)
- dry forest, partial cut (13)
- mesic doug fir, created opening (20)
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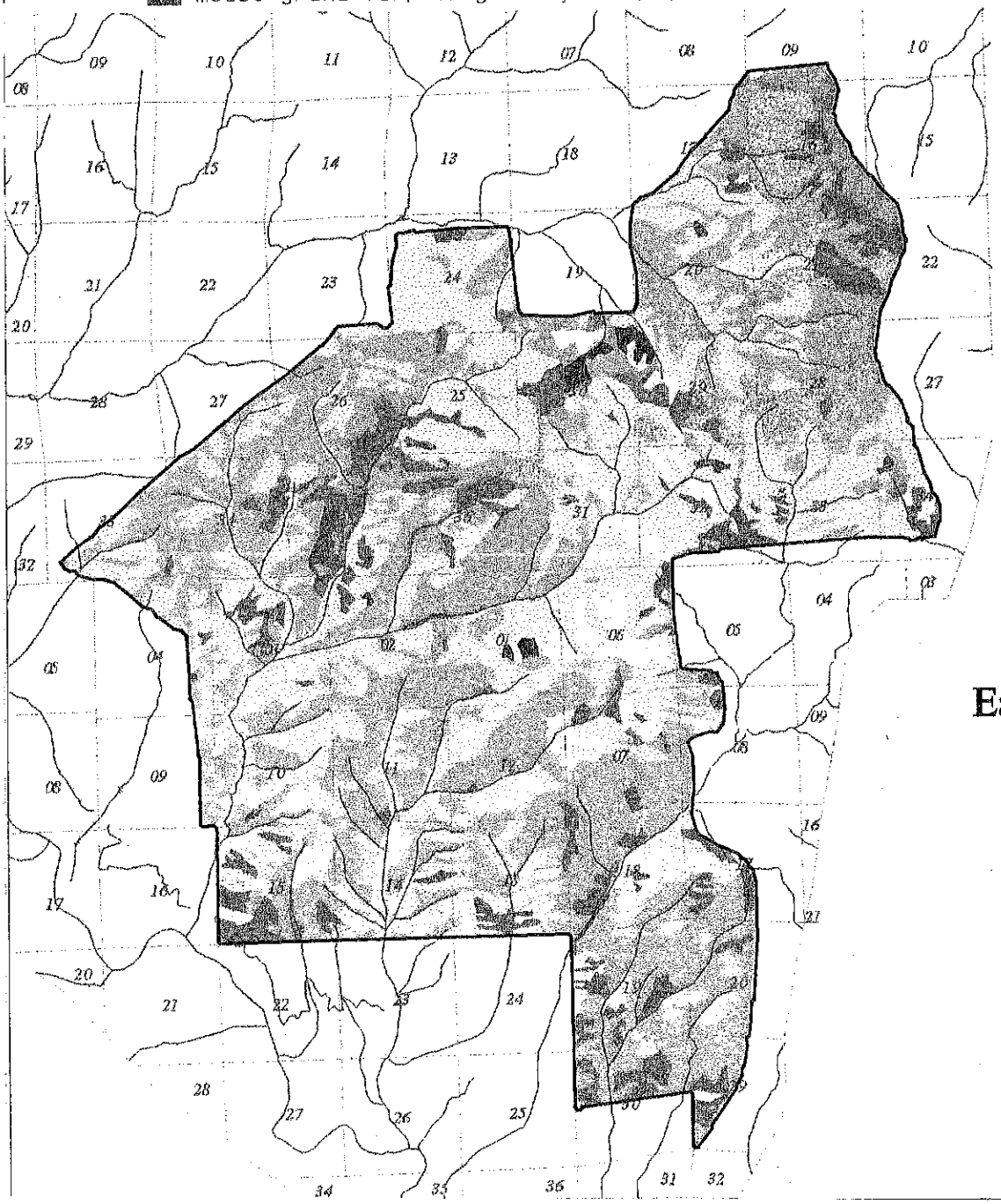
- non forest, grassland, shrubland (99)
- Entiat's Code (100)



Eagle Blagg Allotm

Vegetation Types

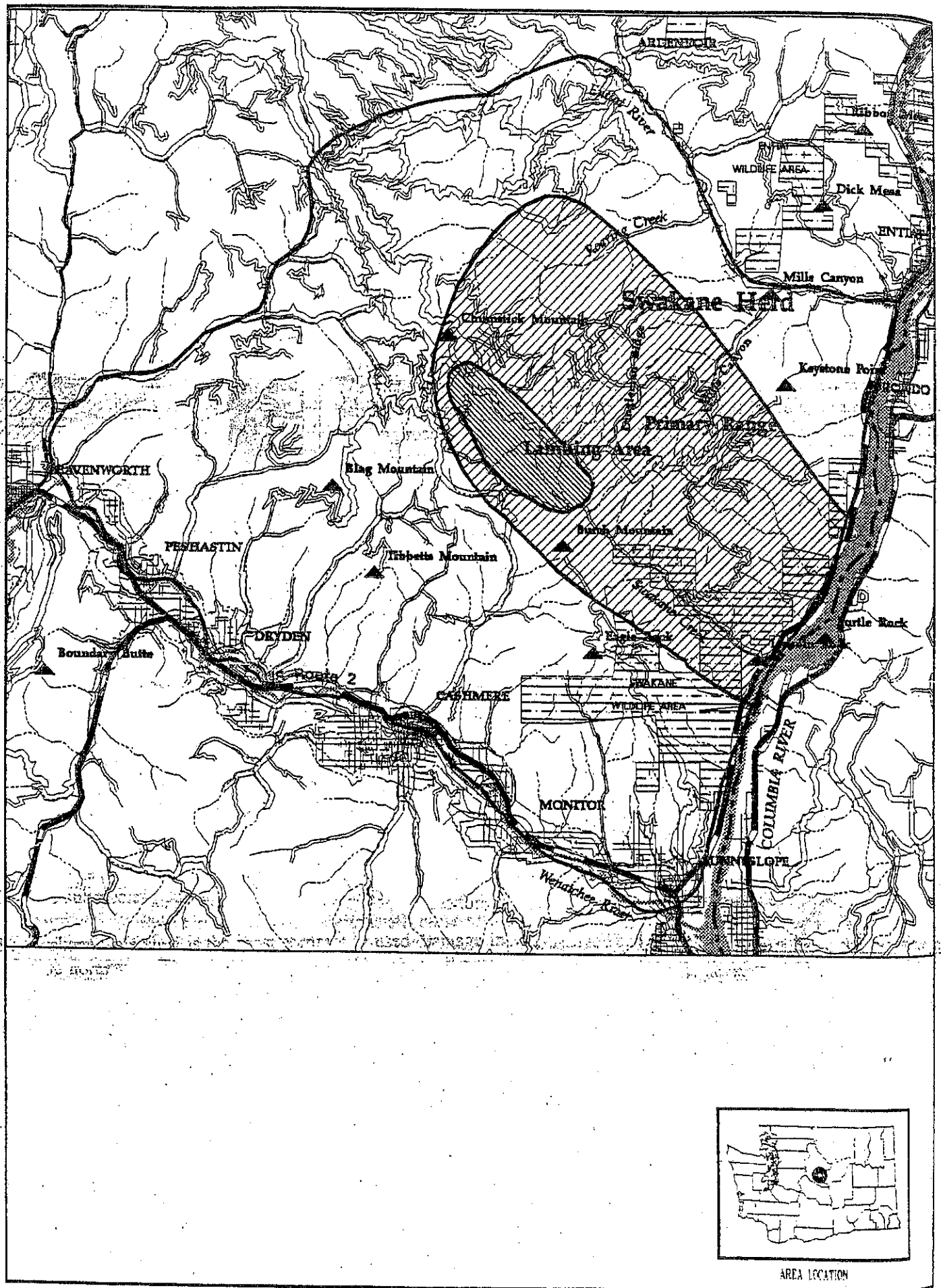


Figure 1. Swakane Bighorn Sheep Range

Appendix B
Figures

-ALLOTMENT ACRES OPEN FOR GRAZING

-PRIMARY RANGE BY ALTERNATIVE

-SUITABLE RANGE BY ALTERNATIVE

ALLOTMENT ACRES OPEN FOR GRAZING

ALTERNATIVE 1

ALLOTMENT	ACRES
Eagle Blagg	21,274
Limekiln	18,309
Mosquito Ridge	14,379
Switchback	11,205
Total	65,167

ALTERNATIVE 2

ALLOTMENT	ACRES
Eagle Blagg	19,817
Limekiln	18,309
Mosquito Ridge	14,378
Switchback	10,884
Total	63,388

ALTERNATIVE 3

ALLOTMENT	ACRES
Limekiln	18,309
Mosquito Ridge	5,576
Switchback	7,601
Total	31,486

ALTERNATIVE 4 — 0 acres open for grazing.

PRIMARY RANGE BY ALTERNATIVE (acres)

ALTERNATIVE 1

ALLOTMENT	ACRES
Eagle Blagg	10,326
Limekiln	6,543
Mosquito Ridge	7,994
Switchback	5,720
Total	30,583

ALTERNATIVE 2

ALLOTMENT	ACRES
Eagle Blagg	9,891
Limekiln	6,543
Mosquito Ridge	7,994
Switchback	5,574
Total	30,002

ALTERNATIVE 3

ALLOTMENT	ACRES
Limekiln	6,543
Mosquito Ridge	3,223
Switchback	3,744
Total	13,510

SUITABLE RANGE BY ALTERNATIVE (acres)

ALTERNATIVE 1

ALLOTMENT	ACRES
Eagle Blagg	19,462
Limekiln	17,223
Mosquito Ridge	9,853
Switchback	10,750
Total	57,288

ALTERNATIVE 2

ALLOTMENT	ACRES
Eagle Blagg	18,570
Limekiln	17,223
Mosquito Ridge	9,853
Switchback	10,470
Total	56,116

ALTERNATIVE 3

ALLOTMENT	ACRES
Limekiln	17,223
Mosquito Ridge	3,708
Switchback	7,489
Total	28,420

APPENDIX C

RANGE CARRYING CAPACITY DETERMINATIONS

Allotments	Range Forage Production (pounds)*** All lands- Federal & Private	Sustainable Range* Federal	Primary Federal Land**
Alternative 1			
Eagle-Blagg	13,807,454	11,376,530	7,670,746
Limekiln	8,251,693	6,777,722	4,150,240
Mosquito	11,868,378	6,777,465	5,908,849
Switchback	8,517,320	4,568,879	3,162,091
Alternative 2			
Eagle-Blagg	12,691,774	10,994,289	7,311,715
Limekiln	8,250,693	6,777,722	4,150,240
Mosquito	11,858,378	6,777,465	5,908,849
Switchback	7,045,368	4,272,165	3,133,616
Alternative 3			
Limekiln	8,251,693	6,598,092	3,664,111
Mosquito	2,891,492	2,659,948	1,908,791
Switchback	5,233,195	2,779,825	2,486,377

*Suitable range represents those acres within the allotment that could be accessed by the permitted livestock and supports the necessary forage to sustain grazing.

**Primary range represents those acres within the allotment that are preferred by the permitted livestock and are considered to be key use areas.

***1998 clipping studies were used to help identify production per acre within the analysis area. Forage is considered the edible portion of the total herbage that is produces annually. The production data is listed as pounds of dry forage.

Appendix D
1998 Annual Operating Plan

ANNUAL OPERATING PLAN
1998

I. MANAGEMENT OF LIVESTOCK

PERMITTED LIVESTOCK

PERMITTEE:_S._Martinez_Livestock_ PERMIT TYPE_Term___ CLASS:_ewes w/ lambs_

Naches Allotment:
Pasture _Nile_____ DISTRICT_Naches_____
Number: _872_____ SEASON OF USE:_06_/_16_-_08_/_31_
Working stock horses: __1___

Pasture _Rattlesnake_____ DISTRICT_Naches_____
Number:__1000_____ Season of Use:_06_/_20_-_08_/_31_
Working stock horses: __1___

Pasture _Manastash_____ DISTRICT_Cle Elum____
Number:_1000_____ Season of Use:_06/16_-_09/16_____
Working stock horses: _0____

Pasture _Swauk_____ DISTRICT_Cle Elum____
Number:_1000_____ Season of Use:_06/10_-_09/10_____
Working stock horses: _0____

Pasture _Mosquito Ridge_____ DISTRICT_Entiat_____
Number:_1000_____ Season of Use:_05/15_-_08/31_____
Working stock horses: _1____

Pasture _Eagle/Blagg_____ DISTRICT_Leavenworth_
Number:_1100_____ Season of Use:_05/14_-_07/20_____
Working stock horses: _1____

Pasture _Switchback_____ DISTRICT_Leavenworth_
Number:_1000_____ Season of Use:_05/15_-_07/10_____
Working stock horses: _1____

Pasture _Limekiln/Sugarloaf_____ DISTRICT_Leavenworth_
Number:_1000_____ Season of Use:_09/01_-_09/15_____
Working stock horses: _1____

Pasture _Rainy Jove/Little Wenatchee_____ DISTRICT_Lk_Wenatchee
Number:_1100_____ Season of Use:_07/21_-_09/10_____
Working stock horses: _0____

BILL FOR COLLECTION

The Bill for Collection will be issued to the permittee 45 days prior to the livestock turn on date. The Bill is due and payable within 30 days of that issuance date. Payment must be received prior to the turn on date regardless of whether or not the actual turn on is delayed. Failure to pay by the due date causes administrative penalty to be assessed as well as interest charges to be added to the subsequent billing.

To comply with new deposit procedures established by the Department of the Treasury, all payments must be made payable to "USDA Forest Service" and mailed to:

Unit Collection Officer, Forest Service
Pacific Northwest Region File #71652
P.O. Box 60000
San Francisco, CA 94160-1652

It is essential that your bill for collection accompany your payment.

You will need to insure that your payment is received by 9:30 a.m. Pacific Time at the above address on the date due. Payments received after that time are deposited as the next day's business. Payment must be received at the above address before turn-on of your stock will be authorized.

To apply for and be billed for a shorter season than that shown on your grazing permit, you must make written application 30 days prior to the start of the permitted season.

Credits or refunds of fees paid may be authorized only where delayed turn on or early removal was specifically ordered by the Forest Officer for resource protection or to insure the meeting of standards and guidelines. No credit/refunds will be approved for permittee initiated actions which result in a shortened season or lower numbers.

RANGE READINESS AND TURN ON

Livestock entry on to the allotment or into a specific pasture will not be permitted until such time as the soils are dry enough to prevent damage and the key plant species are ready to withstand grazing.

The key species for determining range readiness may differ on each allotment and pasture. A list of the key plant species is included with this operating plan (Attachment A).

Because the designated livestock turn-on date on the face of the permit is a guide, and the actual turn-on date is determined by weather and conditions on the ground, the permittee is to notify the Ranger District contact when, in the permittees' opinion, the range is ready for livestock to be turned on to the allotment. Notification will be

five (5) days in advance of the intended turn on date, so that adequate time is provided for the Forest Officer to confirm range conditions.

Permission to turn out must be obtained from the Range Administrator.

LIVESTOCK USE PERMITS FOR WORKING STOCK HORSES AND CROSSINGS

If working stock are to be used, each year prior to sheep turning out onto the allotment the number of working stock horses per allotment must be identified. Working stock horses must be authorized and billed at the current grazing fee.

Trailing and Crossing: The permit (Annual Operating Plan) must indicate dates, time and number of sheep intended to cross and the permit (Plan) must be accompanied by a map with proposed routes of travel and camp sites while enroute. This will be required for each allotment. Sheep enroute on National Forest lands to and from the allotments will be billed for the period of time they spend in transit.

ROUTING/HERDING

Each allotment will have designated travel routes and campsite locations clearly identified on a map prior to sheep arriving on the allotment. This map/schedule will be considered as part of the Annual Operating Plan for the allotment. The actual date of movement along the designated route will be dependent upon weather and conditions on the ground (Attachment B,C,D and maps).

The permittee should plan on spending as much time as necessary in herding the sheep to achieve uniform utilization. Sheep should be kept from concentrating in riparian areas, key meadow areas, and in plantations less than 3 feet tall. This is entirely to the benefit of the permittee as reaching of the allowable use standard on key areas before the scheduled move date will result in early livestock removal from a unit or off the Forest.

Whenever the band is feeding or trailing along the main road, trails or driveways, during the mid-day, they shall not be allowed to bed down or "noon" on the road or trail. They shall be moved off the road or trail so as to leave it open for motor vehicles, hikers, or horsemen to pass without going through the band.

Note that the the camp units shown on the routing plan and map indicate the general camp location. The Forest Service Administrator has the right to require camp sites be bypassed or restrict the number of days a camp can be used. This decision will be based on the previous use and the sites current condition.

SHEEP HERDER'S DIARY

The calender and map provided are for the herder's use. On the map the route is outlined with arrows and the proposed camp sites are located along this route.

On the calender document when sheep arrived and how many, when lambs were shipped, camp moves, losses and cause of the loss.

On the map indicate if the camp site was used or if additional camp sites were added.

On the map indicate if areas adjacent to camps were grazed, or if livestock were trailed elsewhere for grazing on that day(s).

Document on the map where losses occurred by writing the date on the map next to an X.

The map should also be used to show major watering holes and where improvements would help movement and distribution of animals.

See Attachment E for additional herder and camptender instructions.

CAMP CONDITION

All camps must be left in a clean condition. Tent poles and stakes shall be taken down and neatly stacked when breaking camp. When possible, camps shall be at least 100 feet away from main trails. Any temporary hitch rails or tack rails shall be put up without the use of nails and taken down when breaking camp.

SALTING

Sheep will be salted on or near the bedgrounds. Place salt so that potential damage to other resources is avoided. Salt blocks will be placed on rocks, stumps, logs or pegs. Place loose salt in trays or pans. All salt will be placed away from available water, meadows and other grassy areas. Salt will not be placed in reforested plantations were the trees are less than 5 feet tall, in established campsites or in visually sensitive areas. Salt grounds will preferably be located on hardened sites such as landings, closed spur roads or old borrow pit sites. Salt will be moved as bedgrounds and camps are relocated. All salt not consumed by livestock will be removed from the site.

MARKING OF LIVESTOCK GRAZING ON ALLOTMENTS IN ADJACENT AREAS

Marking of livestock will not be required for the 1998 grazing season; however, if there is confusion regarding the grazing routes of adjacent bands of sheep, the Forest Service will reserve the right to require each band of sheep be distinctly marked for field identification in subsequent years.

UTILIZATION AND MONITORING

It is the permittee's responsibility to ensure sheep are grazing within the utilization standards outlined in the Forest Plan. The Forest Service Administrator will be periodically verifying permittee compliance with these standards.

Areas found to be in unsatisfactory condition or with utilization in excess of Forest Plan Standards will be either removed from the grazing area or future use of the area will be restricted.

Utilization standards are set for Riparian areas, Uplands/Forested areas, and Reforestation Units. When allowable use (Forest Plan Standards) has been reached in an area, the sheep will be required to move regardless of the forage available in association with it. Example: Upon investigation it is found the utilization in the Riparian area has been met, however, there is still 2 days of use on the Uplands/Forested area before utilization standards are met. Sheep will be required to move from the area and forgo the 2 days of feed to ensure Riparian utilization is not exceeded.

Utilization measurements and monitoring by Forest Service Administrators will target those areas identified on the allotment maps as key use or sensitive resource areas. Other areas will be monitored as necessary. Permittee participation is encouraged when the Forest Service Administrator reviews the allotment.

MAXIMUM ANNUAL PERCENT UTILIZATION ALLOWED

RIPARIAN AREAS:	SATISFACTORY CONDITION	UNSATISFACTORY CONDITION
Grass and Grass-like forage	40%	0-30%
Shrubs	30%	0-25%

UPLANDS/FORESTED AREAS:	SATISFACTORY CONDITION	UNSATISFACTORY CONDITION
Reforestation Units	40%	0-30%
Forest	40%	0-30%
Grasslands	50%	0-30%
Grass and Grass-like forage	40%	0-25%

Measuring utilization of shrubs will be based on incidence of use, weight, and/or twig length. Example: If 50 leaders out of 100 are browsed, utilization is 50%.

In addition to utilization, the condition of the resource is also a concern. To help facilitate evaluations of resource conditions a range monitoring form is included in this grazing plan (Attachment F). The picture diagrams will help you assess the condition of bed 8rounds, riparian areas and general use occurring on the allotment. The form should be used as a tool in identifying problem areas and can help determine is a particular area needs to be avoided to help

improve it's condition. Shrub use and soil condition can easily be determined by comparing site conditions with the various diagrams. Those sites which compare closely to the "A" labeled diagrams would be considered in good condition. If the bedground or area fits more closely with the "B" or "C" diagrams the resources are deteriorating and would be considered in unsatisfactory condition. Bedgrounds and grazing areas which fit into the "B" or "C" condition should be avoided or used only minimally to allow resources to recover. Depending on the overall condition of the area the Forest Service Administrator may find it necessary to reroute or restrict use in areas found to fit the "B" or "C" condition diagrams.

REMOVAL OF LIVESTOCK FROM THE ALLOTMENT

The off date for an allotment is the date when 100 percent of the livestock are to be removed from the National Forest.

Stock remaining on the Forest after the end of the season may be billed for at the unauthorized use rate and may be cause for action to be taken against the Term Permit.

Stray or lost livestock: If a good faith effort is made to recover missing livestock and recovery is made within one week of the off date, the permittee need not be penalized for excess or unauthorized use. The Forest Service reserves the right to determine if a "reasonable effort" was made to find strays and retains the option to bill for unauthorized use based on this determination.

Extensions of the grazing season, if desired, must be requested at least 21 days in advance of the off date to allow time for inspection and preparation and payment of additional billings if appropriate.

NON USE IN PART OR IN WHOLE

Unless non use is applied for and approved in advance (within five (5) days of the on date on the face of the permit or designated billing date), the permittee must place 90% or more of the permitted numbers on the allotment. Non use applies only to numbers and not to seasons. Approval of non use is not automatic. Personal convenience non use will not exceed three consecutive years. A permit cannot be waived based on sale of permitted livestock if that permit is in personal convenience non use status.

UNAUTHORIZED OR EXCESS USE

Livestock run on the Forest in excess of those authorized under permit and paid for through a bill for collection, or stock grazed outside of the dates or outside of the allotment authorized, must be cause for action to be taken.

Sheep found grazing outside their permitted area may be charged for unauthorized use and a 20% reduction in season of use for 2 years will occur if upon the 3rd written notice the behavior is not remedied.

II. STRUCTURAL AND NON-STRUCTURAL IMPROVEMENTS

MAINTENANCE

You are responsible for maintenance of all range improvements assigned to you in your grazing permit. A list detailing each improvement is included in the allotment specific information provided by the individual Ranger District on which the allotment occurs (Attachment B).

Range improvements are to be maintained at a level that fully serves the intended purpose and perpetuates the life of each improvement. Basic standards for maintenance are included as part of this annual operating plan (Attachment C). All assigned improvements are to be maintained annually whether grazing occurs or not. The permittee will provide the material necessary for maintenance, unless otherwise specified.

Maintenance must occur throughout the season and cannot be a one time action. Damage resulting from big game, wind or other acts of nature, or human caused actions must be repaired in a timely manner so as to insure the integrity of the structure. If serious or repeated problems occur, contact the Forest Officer and work to determine long term solutions.

Failure to properly complete the assigned maintenance to standard and in a timely manner will be cause for denial of permission to either place livestock on the allotment or to move to a pasture and/or may result in action being taken against the Term Grazing Permit.

Where structures have been amortized out through their planned life expectancy and are deteriorating to the point where maintenance is no longer able to repair them to a standard capable of meeting the objectives, work with the Forest Officer to schedule replacement. Normally this will involve a 50:50 cooperative effort between the permittee and the Forest Service.

Maintenance will be spot checked as time permits; or, if the Forest Service is made aware of a possible problem, additional checks will be conducted.

III. OTHER ITEMS

ANIMAL CONTROL DAMAGE: At this point in time, the Wenatchee National Forest is not in a position to approve requests for predator control. The Forest WILL NOT approve such actions as trapping/baiting, shooting or poisoning. Before a request can be granted, NEPA (National Environmental Policy Act) document is required.

NOXIOUS WEEDS: In compliance with the Wenatchee National Forest Noxious Weed Action Plan, an inventory of noxious weed populations will be maintained on each Ranger District. Every attempt will be made to contain,

control or eradicate all Class A and B-designate weeds. The Forest Service, State and local Weed Boards, and permit holder will cooperate in this effort. Your assistance in locating noxious weed sites will greatly assist our efforts. The noxious weeds of most concern on your allotments will be identified in the allotment specific information provided by the individual Ranger District on which the allotment occurs (Attachments B,C,D).

FIRE REQUIREMENTS: The permit holder is responsible for adhering to all fire precautions and regulations. Particular attention should be given to fire restrictions and precautions for propane gun use (Attachment H).

PRIVATE LANDS: The use of allotments which contain intermingled lands is contingent upon the permittee providing the Forest Service evidence that the grazing rights on said lands are controlled by the permittee.

COORDINATION WITH OTHER RESOURCE USES

TIMBER SALE ACTIVITY: Timber sale activity may be occurring on the allotments. Avoid trailing or grazing sheep through active timber sale operations; including falling, yarding, skidding, loading, and slash clean up areas. Also avoid logging traffic and tree plantations (all plantations with trees less than 3 feet tall or less than 3 years old). Please keep the Forest Officer advised as to problems that arise related to timber management activities (such as activities that disrupt routing). An attempt is made to coordinate routing with expected sale activity to minimize these problems. Most of these areas will be marked on the routing map for the allotment (Attachment B). However, conflicts can still occur. When a problem occurs, it is very important that you notify the Forest Officer <u>immediately</u>, for approval of route changes.

PROPOSED, ENDANGERED, THREATENED and SENSITIVE SPECIES (PETS):
<u>Bighorn Sheep</u> - Districts will begin to inventory the occuppied summer and winter range for the three transplant Bighorn sheep herds (Cleman Mnt., Swakane and Umtanum). In the event Bighorn sheep range overlaps a sheep allotment, a Bighorn Sheep Conservation Plan (Species Management Guide) will be developed. New Allotment Management Plans will evaluate the effects of grazing and range management practices on Bighorn sheep. Until such time as a Species Management Guide is completed or Allotment Management Plans are rewritten, the permittee will not be required to alter his operation to accomadate the transplanted Bighorn sheep herds.

<u>Plant locations</u> - There will be no trailing, grazing or bedding of livestock in designated PETS plant locations, unless otherwise designated. Routing will be such that these areas are completely avoided by livestock. Designated areas will be identified on the routing map for each allotment.

RECREATION: No grazing or trailing of sheep will be allowed in Forest Service developed campgrounds or recreational sites, or near any Forest Service water systems. Recreational trails should be crossed at right angles to the trail.

MINING: Grazing is permissible on mining claims, but active mining operations should be avoided. If movement of livestock across active mining is necessary, it will be coordinated with the mine operator.

NO GRAZING AREAS: Other non-grazing areas may be designated within the allotment for site rehabilitation, water quality, visual quality, or other resource related goals. These areas will be marked on maps prepared by the district on which the restriction occurs. Grazing or trailing of sheep will be allowed only as specified (Attachment B).

PERMITTEE RESPONSIBILITY

Livestock Management:

Management of the livestock is the permit holder's responsibility. Management includes making sure they are moved properly, that resource impacts are confined to acceptable levels, and that the annual operating plan is followed.

It is the permittee's responsibility to assure that damage to existing Forest Service facilities, such as; trails, roads, buildings and non-structural improvements, does not occur as a result of actions by herders or livestock.

There must be a full time herder with the band to protect their health and well-being and insure proper utilization. S. Martinez Livestock, Inc (permittee) assumes the responsibility of seeing that the instructions contained in this management plan are carried out by his employees.

Notification:

It is the permittee's responsibility to bring issues, concerns and opportunities to the attention of the designated Forest Officer (below). Many resource activities occur on the allotments during the grazing season. Often it is several months before a situation is brought to the attention of the appropriate official. By then, an existing problem may worsen or an opportunity pass.

Naches Ranger District:
Jodi Leingang (509) 653-2205 ext. 269

Cle Elum Ranger District:
Jodi Leingang (509) 653-3305 ext. 269

North Range Zone - Entiat, Leavenworth, Lake Wentachee Districts
Alex Martinez (509) 664-2785

Reporting:

Records of count, numbers, losses, noxious weeds, and any other information that will help in the management of the allotment should be recorded. Please return this information by November 1 of this

year so that it may be used for project planning during the winter months. Failure to return the requested information may interfere with planning efforts and delay preparation of the Annual Operating Plan for the upcoming grazing season. Delays of this nature could potentially effect the timing of livestock turn-on for the following grazing season.

Please include:

1. Time spent repairing improvements.
2. Materials used for improvement maintenance.
3. Sheep herder's diary information
4. Permit holder's on and off count records.

Additional comments and suggestions pertinent to the management of the allotment could include, but are not limited to:

5. Routing problems
6. Utilization/livestock distribution problems
7. Needed improvements or changes of existing improvements
8. Improvement maintenance problems
9. Locations of poisonous or noxious plants
10. Areas needing revegetation
11. Tresspass

Attachment A: RANGE READINESS INDICATORS

Grasses and Grass-likes

Wheatgrass	Agropyron spp.	About 8 inches in height, seed stalks showing
Idaho Fescue	Festuca idahoensis	Leaves 5 inches in height, seed heads present
Prairie Junegrass	Koeleria cristata	Leaves about 5 inches in height, seed heads conspicuous
Sandberg bluegrass	Poa secunda	Plants maturing, seed heads in dough
Pinegrass	Calamagrostis	Foliage 4-6 inches in height
Tufted hairgrass	Deschampsia caespitosa	6 inches or more in height, headed out
Kentucky bluegrass	Poa pratensis	Seeds heads present
Elk sedge	Carex geyeri	Seed is in late dough stage
Meadow sedges	Carex spp.	Foliage 6" in height

Forbs

Western yarrow	Archillea lanulosa	Flower stalks beginning to show
Arrowleaf balsamroot	Balsamorhiza spp.	Leafage about 3/4 developed, beginning to blossom
Geranium	Geranium spp.	Leafage about 4 inches high, flower in bloom
Groundsel	Senecio spp	Leafage mature, full bloom

Shrubs

Serviceberry	Amelanchier spp.	Part of blossoms out
Antelope bitterbrush	Purshia tridentata	Flower buds conspicuously swollen
Snowberry	Symphoricorpus spp.	7 to 8 pairs of leaves unfolded from each bud

Soils: Normally dry sites should be fairly dry and firm. Moist meadows should have most of the area dry enough to carry stock without breaking the sod and destroying the cover. Both soil and forage indicators must be considered in determining range readiness.

Indicators of Range Not Ready to Use

When in Flower		Soils
Spring Beauty	Claytonia	Soils are wet, loose and subject to excessive compaction or damage from trampling.
Lambstongue fawnlily	Erythronium	
Fritillary	Fritillaria	
Waterleaf	Hydrophyllum	
Sagebrush buttercup	Ranunculus	

WENATCHEE NATIONAL FOREST
NORTH END DISTRICTS:
LAKE WENATCHEE, LEAVENWORTH, ENTIAT, AND CHELAN

ALLOTMENT
MOSQUITO RIDGE

ENTIAT RANGER DISTRICT

1998 GRAZING SEASON

ENTIAT:

Mosquito Ridge ____ Permitted No.: 1000 ewes/lambs and 1 stock horse
Season: 5/15 to 8/31

Limekilin/Sugarloaf
Season: 9/1 to 9/15

GRAZING SYSTEMS

The grazing patterns associated with this allotment are tied to the availability of the existing transitory range identified on the attached map.

OF SPECIAL CONCERN:

Grazing within designated allotment boundaries. There have been problems in the past with sheep grazing outside designated areas. The areas which historically had problems have been in and around Moe Canyon and Roaring Ridge. Problems have been associated with drought conditions and lack of water in the Moe Canyon area. Last season camp sites where adjusted to keep sheep within the boundary and avoid sheep seeking water on privately leased lands. This appears to have resolved this problem.

Lambs are traditionally shipped between mid July and August 1.

Reduction of available transitory range due to forest succession. For several years now parts of Gold Ridge, Medicine Ridge and the upper portion of the Indian Creek basin have been unsuitable for sheep use due to forest succession. This allotment was established because of increased forage availability resulting from the 1970 fires. Within the last 20 years these open areas have been increasing less suitable for sheep due to succession. Because grazing outside the designated areas has been on the increase, it is an indication of decreased suitability of the current allotment.

Season of use, carrying capacity and overall suitability of the allotment will need to be re-evaluated to determine what, if any, changes in the current permit will be necessary.

The area between Roaring Creek and the currently established Allotment boundary was within the Dinkelman fire area. This area burned lightly in comparison to other areas within the fire area. There is a possibility of incorporating this area into the allotment to alleviate the problems associated with the forest succession elsewhere in the allotment.

Other options would be to further investigate completion of the fire break along Gold and Medicine Ridge which would open up the area to the Medicine Ridge Timber Sale units.

Bedding areas should be restricted to previously "hardened" areas such as landings or old spur roads. Sheep should not remain in the same bedding area for more than 2 nights.

Sheep will be salted on or near the bed grounds. Place salt so that potential damage to other resources is avoided. Salt will not be placed in reforested plantations where the trees are less than 5 feet tall, in established campsites or in visually sensitive areas. All salt not consumed by livestock will be removed from the site.

ALLOTMENTS

EAGLE/BLAGG
SWITCHBACK
LIMEKILN/SUGARLOAF

LEAVENWORTH RANGER DISTRICT

1998 GRAZING SEASON

LEAVENWORTH:

Eagle/Blagg ____ Permitted No.: 1,100 ewes/lambs and 1 stock horse
Season: 5/14 to 7/20

Switchback ____ Permitted No.: 1,000 ewes/lambs
Season: 5/15 to 7/10

Limekiln/Sugarloaf ____ Permitted No.: Mosquito Band
Season: 9/1 to 9/15

GRAZING SYSTEM

The routes followed during the 1997 season will be similar to those anticipated during the 1998 season. The exact camp locations may vary depending on resource conditions of the associated bed grounds.

The ewes and their lambs will be using the Eagle/Blagg and Switchback Allotments. In July, when the permitted season ends the lambs and the cull ewes are pulled out. The remaining ewes from the two herds are combined to form a band of 1,100. This combined ewe band is then moved to Lake Wenatchee to finish up the grazing season in the Rainy/Jove & Little Wenatchee Supplement area from July 21 to Sept. 10.

OF SPECIAL CONCERN:

Use of the Limekiln/Sugarloaf Allotment. The face of the permit is allowing use to occur within this allotment between 5/14 and 7/20 for the Eagle/Blagg sheep. Currently use has been in September and the allotment has been utilized to trail one or all of the Mosquito, Switchback and Eagle/Blagg bands annually to the

Plain corrals. The use traditionally has been occurring in August and September.

The late season of use may be in conflict with fall migrating mule deer needs. This will be evaluated this following season and periodically changing the route may be needed to meet multiple resource needs.

This allotment should be incorporated into a rest rotation program to provide opportunity for periodically resting the Switchback and Eagle/Blagg Allotments.

If in the future, the allotment is to be used to trail the sheep to Plain, use needs to be approved and routes/time frames need to be incorporated into the Annual Operating Plan.

Private land owned by the Reebs must be avoided via request from landowner on 8/7/95. Land is located in Merry Canyon T26N, R18E Sec 34 NE/NE. Sheep grazing in front yard and watering in creek has been a problem in the past.

Potential problem due to logging activity in and around the Ty-Chi LSR. Logging units located near Mosquito Ridge Allotment could pose problem as sheep are coming on to the Leavenworth District. Coordination with logging contractors is imperative. May need to reroute sheep through area due to high logging traffic on Forest Service roads.

Billing, validation of the permit and actual use. Under the current permit as per Modification #3, dated May 1987, the season of use for the 2 bands of sheep run from mid May to mid September. The actual season of use given the allotments being used is mid May to the 3rd week in July. Currently bills are based on the following information:

Eagle/Blagg __ 1,100 ewes/lambs---5/14 to 7/20
Rainy-Jove ----1,100 ewes---------7/21 to 9/10

Switchback ____1,000 ewes ____ 5/15 to 7/10

The bill for collection needs to be reviewed to assess it's accuracy. If there are any discrepancies, it will be the permittee's responsibility to notify the Range Administrator.

Resource concerns. Riparian zones within the Switchback Allotment have been over used in the past, especially in and around East Van Camp and where sheep area unloaded up North Fork Eagle Creek. Use will be restricted to 2 nights.

This area is in unsatisfactory condition and acceptable use will be reduced to 0-25%.

The Van Creek Meadow has been over utilized and it is a popular recreational area. As a result utilization will be reduced to 0-25% in those areas.

Ridge trail routes throughout the allotment appear to be in a downward trend as indicated by the increase in cheat grass along these routes. Alternate routes and rehabilitation may need to be investigated. Implementation of a rest

rotation system in the future should be investigated to better meet the needs of the resources.

Chumstick Mt. and Swakane Springs area have been over utilized in the past and resource condition is unsatisfactory. In addition to the unsatisfactory condition of the area, this area is also part of the Big Horn sheep range and Swakane Spring is outside the allotment boundary.

An alternative which should be further investigated is expanding the allotment boundary down the east side of Chumstick Mt. This area was part of the Dinkelman burn. The area did not receive the resource damage that Mills Canyon or Swakane Canyon received during the fire. By incorporating this area into the Eagle/Blagg Allotment it may help ease the conflict with the Big Horns and allow areas in unsatisfactory condition to be rested. Coordination with the Entiat District is necessary.

Swakane Spring is not within the allotment boundary but historically been a critical source of water for managing sheep in this portion of the allotment. Use in this area and the importance of the spring source need to be investigated to see if there are alternate routes available to allow a rest rotation schedule to be implemented.

Sheep will be salted on or near the bedgrounds. Place salt so that potential damage to other resources is avoided. Salt will not be placed in reforested plantations where the trees are less than 5 feet tall, in established campsites or in visually sensitive areas. All salt not consumed by livestock will be removed from the site.

Utilization in and around Swakane Spring and Chumstick Mt. will be restricted to 0-30% due to the condition of the range.

Those areas traditionally used for shipping and unloading sheep (North Fork of Eagle Creek and lower Derby cannon) have been heavily used in the past. In order to reduce the pressure on these areas utilization will be restricted to 0-30%.

shift the crossing to a hardened site and/or route the sheep to avoid the disturbed crossing.

Attachment E:

GENERAL INSTRUCTIONS FOR CAMPTENDERS AND HERDERS

1. For many years it has been the practice to dig a garbage pit at each camp. Because of the increase in recreation use and our effort to establish the "Pack It Out Policy", we need your help in setting a good example for recreation people in wilderness and backcountry.

You can help by observing these rules:

Dig no garbage pit at any camp.

Make sure all garbage is removed completely from campsites.

2. Whenever the band is feeding or trailing along the main road, trails or driveways, during the mid-day, they shall not be allowed to bed down or "noon" on the road or trail. They shall be moved off the road or trail so as to leave it open for motor vehicles, hikers, or horsemen to pass without going through the band. Sheep will stay out of recreation sites and their water sources.

3. When conditions allow, sheep should be held on a different bedground each night. The condition of each bedground will ultimately dictate the length of stay at each site. Bed sheep at least 300 feet away from running water and away from main trails. Do not bed sheep in clearcuts with trees less than 5 feet tall or less than 5 years old.

Grazing in plantations will only be allowed in those areas which are at least 3 years old and/or at least 3 feet tall unless approval is given by the Forest Service Administrator. Inspections by Forest Service Administrator would be done a day or 2 before sheep would enter the area.

Note that the the camp units shown on the routing plan and map indicate the general camp location. The Forest Service Administrator has the right to require camp sites be bypassed or restrict the number of days a camp can be used. This decision will be based on the previous use and the sites current condition.

4. Sheep should be herded over the range so the band is spread out as much as possible while grazing and controlled during trailing.

5. The carcass of any animal that dies on the National Forest from any suspected contagious disease must be promptly moved from trailways, at least 300 feet from water ways or at least 300 feet from campsites.to a safe place and buried at least 300 feet from water. Do not burn the carcass during periods of campfire restrictions.

6. Maintenance of sheep driveways will be the responsibility of the permittee. Any damage done to the cutbanks of the roads will have to be repaired by the permittee.

7. All camps must be left in a clean condition. Tent poles and stakes shall be taken down and neatly stacked when breaking camp. When possible, camps shall be at least 100 feet away from main trails. Any temporary hitch rails or tack rails shall be put up without the use of nails and taken down when breaking camp.

8. No open campfires are allowed when the Wenatchee National Forest restricts campfire. This generally occurs between July 1 and September 15. Be extremely careful with the use of fire.

9. A white gas or propane stove should be used for cooking during the Forest campfire restriction.

Attachment G(a):

PACIFIC NORTHWEST REGION

WATER DEVELOPMENT MAINTENANCE STANDARDS

I. Spring Developments

A. Troughs:

1. Shall be capable of holding water for the intended purpose. Holes are to be plugged, mended or trough replaced.
2. Metal troughs shall have treated wood or rock supports under them to prevent rusting.
3. Troughs will be cleaned annually with debris removed and shall contain no more than 2 inches of mud, needles, etc. on bottom.
4. Shall have a functional escape ramp for birds and small mammals.

B. Pipes

1. Inlet pipe shall carry water from the spring box to the trough and not leak.
2. Drain pipe to be kept open, operating and able to drain overflow away from trough to keep area 20 feet around trough reasonably dry.
3. The inlet and overflow pipe shall be covered with soil, rock, logs, etc. to protect it.
4. Water shall not leak between the spring box and pipe.

C. Spring

1. Spring source shall be protected from livestock trampling to prevent soil displacement, turbidity and sealing of the water from the pipe. Fences protecting the spring source will be maintained to standards.
2. A reasonable amount of water shall flow from spring into pipe.
3. Spring boxes to be kept clean of debris.

II. Stock Ponds and Reservoirs

A. When more than one half of the storage is lost due to siltation, the pond or reservoir shall be cleaned out.

B. Soil displacement shall be prevented in spillways. This may require riprap placement around the spillway.

Attachment G(b):

PACIFIC NORTHWEST REGION

SPECIFICATIONS FOR FENCE MAINTENANCE

Fences shall be maintained by completing the following repairs:

1. Clearing - The fence right-of-way is 6 feet wide and 10 feet high on each side of the fence. All logs, trees, limbs, slash, brush, and other material will be removed from the right-of-way unless otherwise specified.

2. Wire - All broken wire shall be spliced only with good barbed wire or double strand barbless wire. Three or more splices within a distance of 20 feet will be replaced with a single splice. Broken wire will be pulled tight with wire stretchers. Use "pigtail" with at least three wraps. Alternate splices that may be used are the Western Union and Nicro Press. No twisting of wire to take up slack shall be permitted. All slack wire will be pulled tight with stretchers. Wire will be tied off with at least three wraps at all anchor points. Wire spacing and weighting to be the same as in the original construction.

3. Staples and Nails - Missing staples shall be replaced. Restaple all loose wires. Staple not to be driven home but to a point just where the barbwire will render or give. Missing nails in jacks and figure-fours shall be replaced. 50D or 60D nails are to be used.

4. Gates - Gates will be repaired or replaced to as originally constructed and will be shut. When tightening bars are rebuilt, a chain will be used.

5. Rock-jacks, Figure-fours, and Stays - Rock-jacks that need rebuilding shall be constructed according to Forest Service specifications. Figure-fours that need replacing shall be built with the bottom piece touching the ground at one end and the other end at least 6 inches above the ground.

Wooden stays that need replacing shall be at least 2 inches in diameter and not over 4 inches in diameter.

Western larch is the preferred material. No limb wood, white fir, or ponderosa pine sapwood will be used. If round material is used, the bark shall be skinned on two sides. Jack and figure-four material shall not be less than 3 inches by 4 inches in size.

Attachment H:

FIRE PRECAUTION REQUIREMENTS

The permittee shall state how and where they or their representative can be contacted in a fire or other emergency.

FIRE SECURITY shall consist of REPORTING and TAKING SUPRRESION ACTION on any fires detected.

FIRE EQUIPMENT AND EQUIPMENT ON TRUCKS, TRACTORS, POWER SAWS, ETC.

All power driven equipment operated by the permittee will have:
- an approved, properly mounted and working spark arrester
- a 5BC or larger UL rated fire extinquisher
- a long handled, round point, size 0 or larger shovel
- a doubel bit axe or pulaski tool.

Exhaust equipment, including spark arresters and mufflers, shall be properly installed and constantly maintained in a servicable condition.

SMOKING AND OPEN FIRES

Smoking and open fires shall be allowed only at the option of the permittee.

The permittee and the permittee representative shall follow all regulations governing open fire use and restrictions as provided (see fire precaution schedules - attached).

OTHER

The herder's campwagon must have any cooking or heating fire completely out before the campwagon is moved.

ATTENTION: ANYONE WHO BUILDS A FIRE IS RESPONSIBLE FOR IT AND WILL BE HELD LIABLE FOR DAMAGES RESULTING FROM SUCH ACTION!! USE CAUTION!

Attachment H (cont):

FIRE PROTECTION AND SUPPRESSION

Supplement to Fire Protection Requirements
For Range Permit.

Fire Precautions for Propane Cannon, Predator Control Device:

1. Propane cannon which produces loud reports at regular intervals for predator control will be allowed only when the following conditions are meet.

    a. Can only be used when Industrial Fire Precaution Class (IFPL) is a I for the zone where it is to be used. In periods when the level is II, III or IV use of these devices will not be permitted.

    b. The portion of the device which contains the pilot light will sit in the center of a 4 foot diameter circle cleared to mineral soil.

    c. A wind screen of nonflammable material, a height which is a minimum of 8 inches above pilot light, placed directly around the portion of the device which contains the pilot light. In winds greater than 5 miles per hour the use of the control device will not be permitted.

    d. An additional 3 foot wide area adjacent to mineral soil clearing will be cleared of flammable material, litter, woody debris and grass. This will provide a total area for the device of 10 feet.

    e. When in operation the device must not be left unattended. A person must be able to monitor the site.

    f. Propane supply must be off if device is not in use or left unattended.

Permittee will be liable for fires caused by this device at all times, regardless of whether conditions of this supplement (Fire Protection and Suppression) are met or not.

R6-FS-6300 (supplement)

EMERGENCY FIRE PRECAUTIONS. Permittee shall restrict operations in accordance with the Industrial Fire Precaution Levels attached. Forest Service may change the Industrial Fire Precaution Levels to other values upon revision of the National Fire Danger Rating System and may change the specific Industrial Fire Precaution Levels when such changes are necessary for the protection of the National Forest. When sent to Permittee, the revised Industrial Fire Precaution Levels will supersede the attached levels.

INDUSTRIAL FIRE PRECAUTIONS SCHEDULE

LEVEL	INDUSTRIAL FIRE PRECAUTION

I. Closed Season - Fire precaution requirements are in effect. A Fire Watch/Fire Security is required at this and all higher levels unless otherwise waived.

II. Partial Hootowl - The following may operate only between the hours of 8 P.M and 1 P.M. local time:

power saws, except at loading sites;
welding or cutting of metal.

III. Partial shutdown - The following are prohibited:

power saws - except at loading sites and on tractor/skidder operations between the hours of 8 P.M. and 1 P.M. local time.

In addition, the following are permitted between the hours of 8 P.M. and 1 P.M. local time:

mechanized loading and hauling;
welding or cutting of metal;
any other spark-emitting operation not specifically mentioned.

IV. General shutdown - All operations are prohibited.

INDUSTRIAL FIRE PRECAUTIONS SCHEDULE (CONTINUED)

The following definitions shall apply to these Industrial Fire Precaution Levels:

Closed Season (Fire Precautionary Period): That season of the year when a fire hazard exists and as described in A16.

Hauling - Where hauling involves transit through more than one shutdown zone/regulated use area, the precaution level at the woods site shall govern the level of haul restrictions, unless prohibited by other than the Industrial Fire Precaution Level system.

Loading sites/woods site: A place where any product or material (including but not limited to logs, firewood, slash, soil, rock, poles, posts, etc.) is placed in or upon a truck or other vehicle.

Advance written waiver of the above precautions may be issued by the District Ranger.

Such waiver, or substitute precautions, shall prescribe measures to be taken by the permittee to reduce the risk of ignition, and/or the spread of fire. The District Ranger shall consider site specific weather factors, fuel conditions, and specific operations that result in less risk of fire ignition and/or spread than contemplated when precaution level was predicted. Consideration shall also be given to measures that reduce the precaution levels above. Permittee shall assure that all conditions of such waivers or substitute precautions are met.

Permittee shall obtain the predicted Industrial Fire Precaution Level from the appropriate Ranger District headquarters. If predictions made after 6:00 P.M., local time, are significantly different than originally estimated, Forest Service will inform Purchaser when changes in restrictions or industrial precautions are indicated.

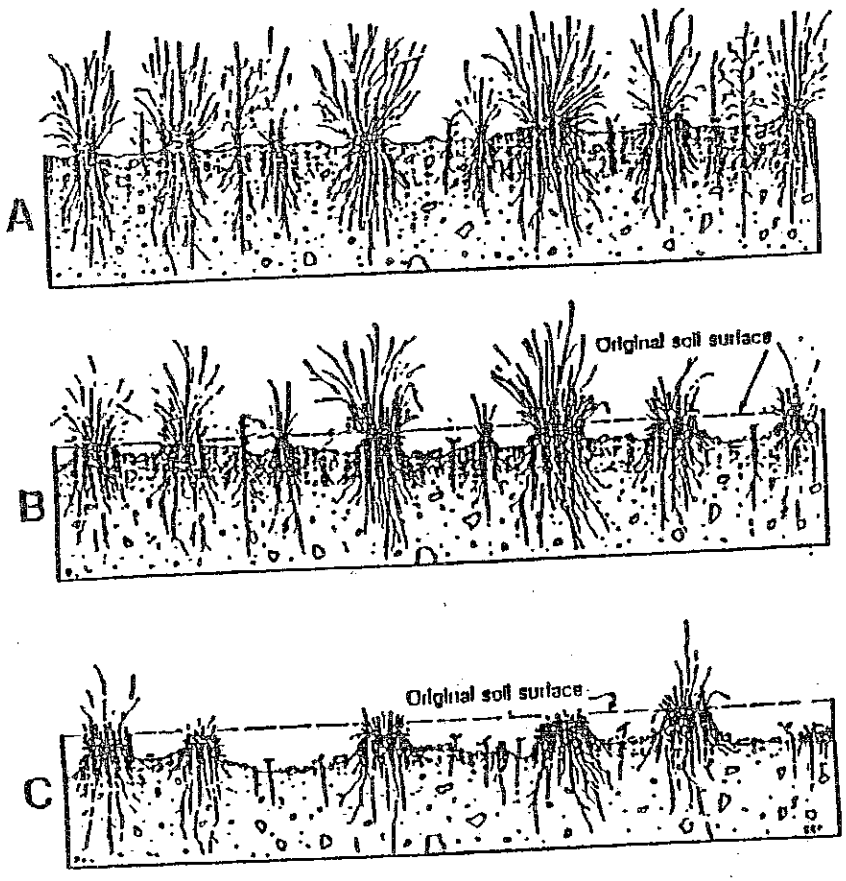
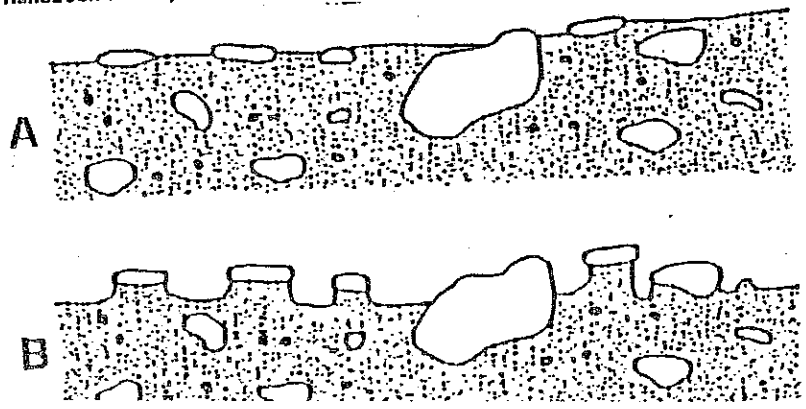


Figure 8.
Formation of soil remnants. A) Thinned stand of plants and scarcity of litter permit erosion by sheet wash and raindrop splash. B) More soil has been carried away; plants are left on pedestals, and small stones accumulate at surface. C) Plants are weakened and dying not only because of heavy grazing but because of drying from root exposure and undercutting by erosion. Accumulation of stones on surface shows development of an erosion pavement. (USDA Forest Service Handbook No. 19)



UTILIZATION AND APPARENT TREND SCORE CARD

Name of pasture _____

Study site _____

Name of observer _____

Date _____

Guide to Degree of Use

Circle the level that best describes current use of plants in monitoring area.

Use Level	Description
None	No grazing use.
Light	Only best plants grazed.
Moderate	30-60 percent use of primary forage plants grazed, most of the range is grazed, but with little use on poor forage plants.
Heavy	Primary forage plants almost completely used. Some use on low value plants.
Severe	Primary forage plants weak from repeated cropping. Low value plants also grazed.

Trend

Circle your estimate of each factor. Trend score is the sum of all circled numbers.

	Yes	Maybe	No
1. Do the desirable species make up more than one-half of the vegetation cover or weight?	+2	0	−2
2. Are desirable plant species abundant in all age classes?	+2	0	−2
3. Does leaf length, seed production and color of desirable plants indicate strong vigor?	+1	0	−1
4. Is there any evidence of overgrazing (hedging) on shrubs?	−1	0	+1
5. Is litter fairly abundant and some composed of desirable plants?	+1	0	−1
6. Is there evidence of soil movement or loss (wind or water)?	−2	0	+2
7. Are plant roots exposed or other signs of pedestaling?	−1	0	+1

Trend Score (total 10) ____

RECORD GENERAL OBSERVATIONS

1. Rainfall during the current year: ___ way below average: ___ slightly below average ___ average: ___ slightly above average: ___ way above average.
2. Describe growing season conditions: ___ above average: ___ average: ___ below average
3. Describe any unusual ecological events (i.e., insects, fire, hail, etc.) _____
4. Other comments _____

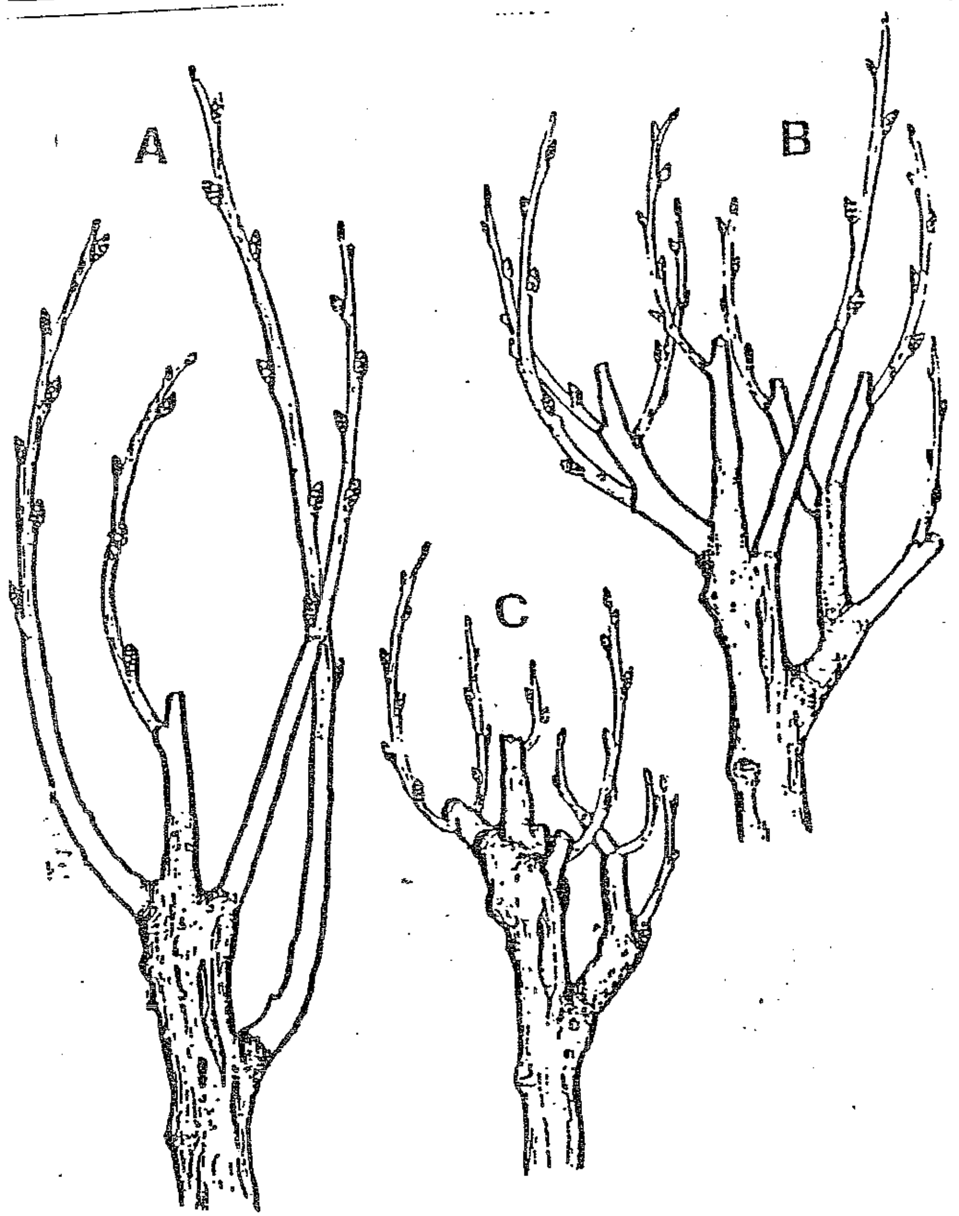


Figure 10

e three degrees of hedging are based on the length and appearance of two-year-old wood
avious year's leaders) immediately below the current leaders. If more than one degree of hedg-
| is evident on a plant, form class is based on the predominant or average condition. The three
grees of hedging are:

-Little or no hedging — Two-year-old wood is relatively long and unaltered or only slightly altered.

-Moderately hedged — Two-year-old wood is fairly long but most of it has been altered from the normal growth form.

-Severely hedged — Two-year-old wood is relatively short and/or strongly altered from the normal growth form.

Appendix E
Swakane Bighorn Sheep Herd Plan

I. General Area Description

A. **Location:** The Swakane herd of California bighorn sheep (*Ovis canadensis californiana*) is located in the central portion of the state, approximately 13 km (8 mi) north of Wenatchee, Washington, in eastern Chelan County (Fig. 1). The herd is nonmigratory and remains within townships 23 to 25 north and ranges 18 to 20 east.

The herd range lies along the east front of the Cascade Mountains. Major drainages include the Columbia River which forms the southeastern boundary of the herd, the Entiat and Wenatchee rivers, which flow southeast into the Columbia River, Swakane Creek which flows southeast through the core of the herd distribution into the Columbia River, Roaring Creek and Mills Canyon which flow northeast into the Entiat River, as well as various tributaries of these drainages. Major topographic landmarks include Burch Mountain, Dingleman Ridge, and Chumstick Mountain. The Forest Service recommends establishing a subherd on the north shore of Lake Chelan. This option should be evaluated. The 1988 Dinkleman Fire burned 54,000 acres and the 1994 Tyee Fire burned 136,000 acres in this vicinity. Fires of large size in this area have been common in the past. Fire can be used as a tool to maintain habitat for bighorns.

B. **Ownership:** The Swakane area is approximately 518 km^2 (200 mi^2). Approximately 50% of the area is part of the Wenatchee National Forest (USFS), 36% is privately owned, and the remainder is about evenly split between the Washington Department of Fish and Wildlife (WDFW), the Washington Department of Natural Resources (DNR), and the Bureau of Land Management (BLM). The WDFW land includes the Swakane Wildlife area a sub-unit of the Colockum Wildlife Area. The Forest Service acquired thousands of acres in this area in 1995 from the city of Seattle.

The "core area" for the Swakane herd encompasses most of the area utilized by the herd year round. This area is approximately 80 km^2 (50 mi^2) and includes 66% USFS, 16% private, 14% WDFW, and 4% DNR.

C. **Topography:** Elevation in the area ranges from about 195 m (640 ft) along the Columbia River near Wenatchee to 1,770 m (5,810 ft) at Chumstick Mountain on Entiat Ridge. The area is generally steep and rocky which is characteristic of Chelan County. Swakane and Roaring creeks offer the steepest terrain and most of the rock outcrops

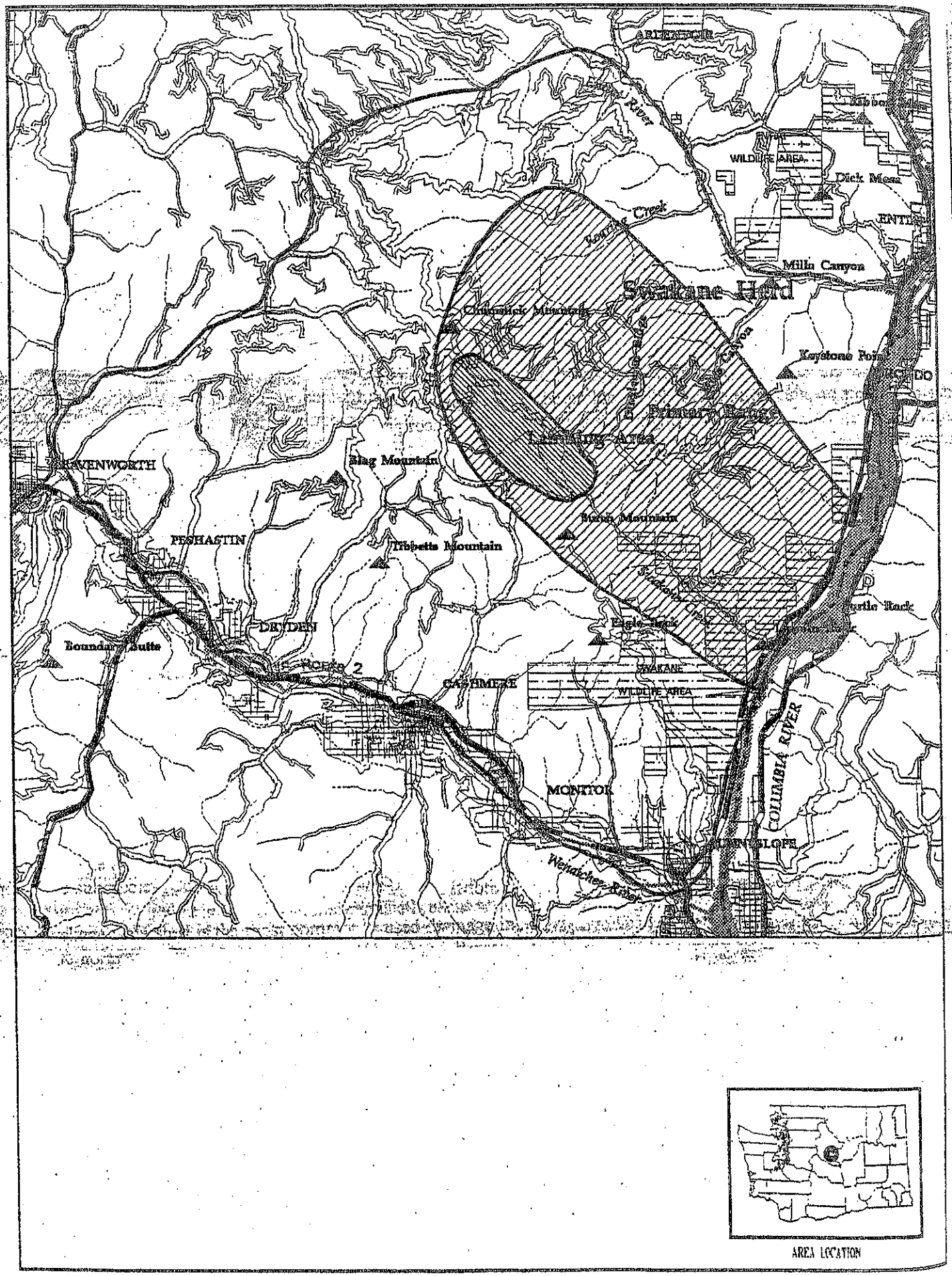


Figure 1. Swakane Bighorn Sheep Range

D. **Vegetation:** The southern third of the area is generally too arid to support many conifers. This area is primarily shrub-steppe with occasional mixed conifers on north slopes and ponderosa pine on other exposures. Grasses have increased in the shrub-steppe zone while shrubs have decreased over the last 5 years as a result of wild fires.

The northern two-thirds of the area supports mixed conifers including ponderosa pine, lodgepole pine, Douglas fir, western larch, and grand fir. The eastern corner of the area supports most of the dense, closed canopy conifer stands. Open timber with a grass and deciduous shrub understory characterize the remaining upland area. This open, early seral condition is the result of a large wild fire that occurred in 1989. Riparian zones are dominated by deciduous shrubs and trees including: alder, birch, cottonwood, red-osier dogwood, snowberry, ocean spray, clematis, poison ivy, and wood rose.

E. **Human Influences:** Access to the core area is via U.S. highway 97A north from Wenatchee then northwest on an unimproved road up Swakane Creek. The entire area is heavily roaded. One of the problems for this herd is scattered private ownerships and existing road systems. There are no significant mineral or fossil fuel developments in the area. However, the region has a long history of mining and there are numerous claims. Most forested habitat within the area above 914 m (3,000 ft) is managed as commercial forest and has been selectively logged at least once in the last 100 years. Orchards, pastures, and residential development form a continuous border around the west, south, and east sides of the herd area.

F. **Other Ungulates:** Mule deer are common in the area and number around 1,500 - 2,000 in winter. Few elk use the area due to liberal hunting seasons. A few cattle graze private land bordering the area. There is a domestic sheep grazing permit on Forest Service land in the northern portion of the area and they occasionally overlap with bighorns. The Forest Service plans to initiate a cattle grazing allotment in this area in 1996. NEPA work has begun and is expected to be completed before March 1996. The Forest Service desires to manage for a larger area to provide more flexibility in dealing with bighorns, livestock, wildfires and adjacent human influences.

II. Sheep Distribution

A. **Historic Distribution:** The historic distribution of the two bighorn subspecies within the state is not that clear. However, there are specimens from this area which indicate that California bighorns are the native subspecies (Cowan 1940, Johnson 1983).

B. **Current Distribution:** The Swakane watershed is the most commonly used drainage in the area. Ewes and lambs use the north side of the canyon year around and usually can be found between Rattlesnake Spring and Chumstick Mountain. Rams favor the south side of the canyon during summer, but move into closer proximity of ewes during fall. Both ram and ewe bands use the lower irrigated bottomlands of the Swakane drainage during winter and early spring. Roaring Creek, a tributary to the Entiat River, is used by a few sheep year around.

Rams seem to wander more than ewes and lambs and occasionally use canyons north of Swakane Creek to Tenus George Canyon, and south to Burch Mountain Road. Rams have been reported several times in Van and Eagle creeks in the last 5 years.

C. **Future Distribution:** Bighorns currently are using the best habitat in the area. There is the possibility of expanded use of the Swakane drainage and movement into the Columbia River breaks if water resources are developed. Roaring creek drainage seems to be underutilized and offers good potential for increased sheep numbers.

III. Habitat Management

A. **Current Status of Habitat and Management Activities:** In general, habitat within the core area appears good for bighorns. Areas used by the herd are steep, open and rocky, and escape terrain is adequate for the current herd size. However, escape habitat is limited elsewhere or is discontinuous making it difficult for bighorns to expand into new areas. Unfortunately, escape terrain is a habitat component which cannot be managed.

The Swakane herd uses habitat with more cover than other bighorn herds in the central part of the state. All seasonal ranges contain scattered conifers or open conifer stands with dense deciduous cover in draws and along streams. The 1989 fire which opened canopies and set back plant succession and massive rehabilitation efforts after the fire, including aerial seeding and fertilization by the Forest Service, and reduction in the number of mule deer, were favorable to bighorns.

The Swakane Wildlife Area is the heart of the core area and is extremely important to the herd. The Department has an agreement with a sharecropper which includes approximately 56 ha (140 ac) of irrigated alfalfa on the Wildlife Area in Swakane Canyon. The alfalfa provides highly nutritious forage to a variety of wildlife during winter and spring. If this program were to stop, sheep would lose this valuable forage source and the area would be susceptible to invasion of noxious weeds. Russian knapweed is already a problem in the Swakane area. Also bighorns may be more apt to wander onto privately owned irrigated land where damage complaints and contact with domestic sheep are more likely.

Water seems to be a factor influencing summer distribution, particularly for ewes and lambs. Development of springs or construction of big game cisterns would allow bighorns to spread throughout otherwise suitable habitat.

B. **Habitat Management Objectives and Strategies:**

1. Maintain and improve habitat conditions in the core area.
   a. Continue the cooperative agricultural program within the Wildlife Area.
   b. Establish water developments throughout the core area.
   c. Conduct weed control efforts on the Wildlife Area.
   d. Monitor human development and impact on bighorns.

2. As bighorn herd size increases promote expansion into suitable habitat.
   a. Develop additional habitat improvement projects where appropriate and feasible.
   b. Investigate acquisition of privately owned suitable habitat within the Swakane area.

IV. Herd Management

A. **Herd History, Current Status, and Management Activities:** The initial reintroduction into the Swakane area occurred in 1969 when nine California bighorns from the Sinlahekin Habitat Management Area were released (WDFW 1995). The herd grew to 20 animals within a few years but then was essentially stagnant throughout the 1970's (Fig. 2). The herd increased slowly to about 30 by 1980 but again was stagnant for a number of years. An additional ram from Northwest Trek Wildlife Park was released into the area in 1987. The most recent survey indicated there were 35-40 sheep in the herd (Table 1).

This herd has not been surveyed annually. The herd is not easily observed from the ground and money has not always been available. Sightability problems associated with observing sheep in timber, combined with the reaction of bighorns to low flying aircraft (Bleigh et al. 1994), have made aerial surveys difficult for this herd. A helicopter survey in June would be the most productive because of local weather conditions and lambs and ewes are bunched together. There are currently eight radio-collared sheep in the band which are being monitored from fixed-wing aircraft. This type of aerial monitoring, combined with an annual helicopter and incidental sightings from the ground, appears to be the best way to estimate population characteristics of this herd.

The radio-marked sheep on the area are part of a research project designed to investigate the poor population growth of the herd. It is suspected that *Pasteurella* introduced from domestic sheep may be the cause, but hard evidence is lacking. Bighorns have occasionally overlapped with domestic sheep in the northern portion of the area. In January 1994, eight of nine sheep tested positive for *Pasteurella haemolytica*. Fenbendazole blocks placed on winter range the last 2 years appear to have been effective in reducing lungworm loads. Monitoring of disease and parasites impacts should continue. Anthelmintics blocks should be distributed when needed. Trace mineral selenium blocks should be supplied annually.

The impact of predation on the herd is unknown. Escape terrain in the core area is adequate, but certainly predators may impact lamb survival.

The statewide bighorn sheep management plan recommends that at least 20 sheep be reintroduced to an area when starting a new herd (WDFW 1995). Although this herd was started in 1969, and has sustained itself for 25 years, only 10 sheep were transplanted to the area. Because of the small initial transplant, inbreeding may be part of the reason for poor herd growth. A transplant of 10 additional animals would be needed to meet the recommendations in the statewide plan.

The statewide plan includes hunting strategies (WDFW 1995). The Swakane herd has not been large enough or had enough mature rams to be hunted. However, the herd is close to meeting the criteria and it is possible that one ram permit may be issued by the 1996 or 1997 hunting season.

Because of the proximity of this herd to Wenatchee and generally good roads in the area, the Swakane herd provides good viewing opportunities for the public. This could be increased with more publicity, but the most heavily used road in Swakane Canyon runs along the alfalfa fields which the sheep use heavily in the winter. Until herd growth increases and sheep expand their distribution no increase in nonconsumptive use is recommended.

Recent population estimates would indicate that the herd size is not likely to substantially change in the near future. But there appears to be some improvement in lamb survival and with proper management this herd could begin a significant increase. Potentially, the herd could increase to 50-60 sheep in the next 5 years and the area is large enough to eventually support 150 bighorns.

B. Herd Management Objectives and Strategies:

1. Increase knowledge of herd characteristics.
   - a. Conduct an annual herd composition survey during late spring.
   - b. Continue radiotelemetry study to monitor herd survival and distribution.
   - c. Gather additional information during ground surveys and in conjunction with other fieldwork.
   - d. Estimate population size, and age and sex structure using survey data and modeling techniques.
2. Increase estimated population size to 50-60 sheep within 5 years and achieve average ram and lamb:ewe ratios of 50:100 over the period.
   - a. Evaluate the impact of predation on the herd.
   - b. Evaluate the impact of diseases and parasites on the herd and put out medicated blocks as needed.
   - c. Monitor domestic sheep distribution and work with Forest Service to adjust allotment boundaries.
   - d. Provide trace mineral/selenium blocks annually.
   - e. Transplant into the herd at least five additional sheep.
3. Increase recreational opportunities of the herd.
   - a. Evaluate the possibility of consumptive use annually and follow criteria established in the statewide plan for setting permit numbers.
   - b. Maintain current level of nonconsumptive use of the herd.

V. Research Needs

The current research project on the Swakane herd should be continued for at least 4 to 5 years to provide further information on condition of the herd, survival and factors of mortality, herd growth, and seasonal distribution. This would require radio-collaring three or four sheep a

year, which could be new sheep transplanted to the herd or sheep currently in the herd. At least monthly relocation flights would be needed. These flights also would be used to determine population characteristics.

VI. Spending Priorities

A. **Conduct population surveys.**
Estimated cost for an annual helicopter survey is about $1,500/year. Additional day trips in the area to conduct ground surveys will cost about $600/year.

B. **Continuation of the Swakane research project.**
This includes the cost of trapping and radio-tagging three to four sheep/year for 4-5 years and monthly monitoring. Estimated cost of trapping and radio collars is $2,000-$2,500/year. Monthly surveys from fixed-wing aircraft would cost about $3,000/year.

C. **Assessment of herd health and distribution of mineral medicated blocks.**
This includes collection and analysis of fecal pellets and distribution of blocks medicated with fenbendazole at an estimated cost of about $200/year as needed. Cost of distributing trace mineral blocks is about $50/year.

D. **Forage enhancement.**
Continue and improve agricultural program on wildlife lands. Do controlled burns, fertilization, and seeding as necessary.

E. **Transplant five additional bighorns to the herd.**
This includes trapping five sheep from in-state herds using a helicopter, conducting medical checks, transporting the animals to the Swakane site, and releasing them. Estimated cost is about $3,000.

F. **Development of water resources.**
Projects designed to develop existing springs or create water impoundments need to be developed. Estimated cost of such projects is $5,000-$10,000.

G. **Conduct weed control projects.**
Specific projects need to be developed but aerial herbicide treatments from fixed-wing aircraft can be conducted for about $10-$15/acre.

VII. Literature Cited

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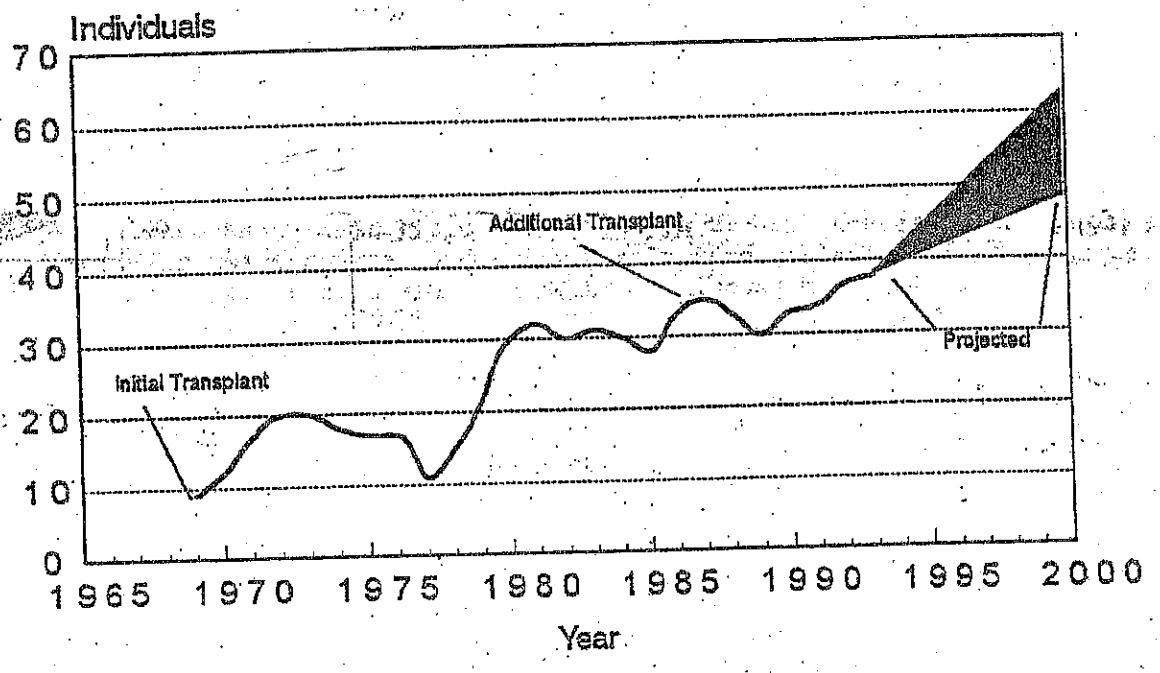

Figure 2. Population estimates of the Swakane bighorn sheep herd since reintroduction.

Table 1. Late fall population statistics for the Swakane bighorn sheep herd, 1989-1994.

	Population Estimate	Lambs/100 Ewes	Rams/100 Ewes	Hunter Permits
1994	35-40	30	35	0
1993	35-40	N/A	N/A	0
1992	30-35	N/A	N/A	0
1991	30-35	N/A	N/A	0
1990	30-35	N/A	N/A	0
1989	25-30	N/A	N/A	0

Prepared by: John Morgan, WDFW, Olympia
John Musser, WDFW, Wenatchee

Appendix F
Draft Guidelines for Domestic Sheep Management in Bighorn Sheep Habitat

Department of Agriculture Service

Reply to: 2200/2600

Date: SEP 0 2 1992

Subject: Domestic Sheep Management in Bighorn Sheep Habitats

To: Forest Supervisors

Enclosed is a July 13 letter from the WO which discusses domestic sheep management in bighorn sheep habitats. Included in their letter is a copy of the Bureau of Land Management (BLM) "Draft Guidelines for Domestic Sheep Management in Bighorn Sheep Habitats."

We endorse their letter and encourage you to work toward solutions that are sound for the resource, and bring people into the solution. The draft BLM guidelines are a good starting point to discuss this issue.

JOHN E. LOWE
Regional Forester

Enclosure

cc:
ERWA (Noel Larson, Don Nelson)
FWB (Hugh Black)
Forest Range Staff Officers